University of Tampere

School of Management

MGE-Master' Degree Programme in Public Economics and Public Finance

HOUSING AFFORDABILITY IN THE CZECH REPUBLIC AND FINLAND

Dostupnost bydlení v České republice a Finsku

Master´s thesis

Thesis supervisor:

Prof. Hannu Laurila

doc. Mgr. Jiří Špalek, Ph.D.

Author:

Ing. Dominika Čižnárová

Brno, 2016

Jméno a příjmení autora:	Ing. Dominika Čižnárová
Název diplomové práce:	**Dostupnost bydlení v České republice a Finsku**
Název práce v angličtině:	Housing Affordability in the Czech Republic and Finland
Katedra:	veřejné ekonomie
Vedoucí diplomové práce:	doc. Mgr. Jiří Špalek, Ph.D.
Rok obhajoby:	2016

Anotace

Diplomová práca sa venuje problematike dostupnosti bývania v Českej republike a Fínsku s cieľom identifikovať koľko domácností je nadmerne zaťažených nákladmi na bývanie. V úvahu boli vzaté prostredie politiky bývania a rozdielne prístupy k problematike dostupnosti bývania v závislosti na právnom dôvode užívania bývania domácnosťou. Na základe výsledkov bolo zistené, že nájomné bývanie je pre fínske domácnosti oveľa dostupnejšie v porovnaní s Českou republikou, kde významná časť domácností čelí zhoršujúcej sa dostupnosti bývania.

Annotation

This thesis deals with the housing affordability measurements in the Czech Republic and Finland in order to identify how many households are burdened with high housing costs. The environment of housing policy is taken into account and there are different housing affordability approaches depending on the tenure status of the households. This thesis presents long-term results in order to see the development of housing affordability. According to the findings, Finnish rental housing is far more affordable than in the Czech Republic where a significant percentage of rental households are facing worsening housing affordability.

Klíčová slova

Dostupnosť bývania, náklady na bývanie, disponibilný príjem, príspevok na bývanie, politika bývania, regulácia nájomného, EU-SILC, probit model, finančné faktory

Keywords

Housing affordability, housing costs, disposable income, housing allowances, housing policy, rent regulation, EU-SILC, probit model, financial factors

Declaration

I hereby declare that I have developed and written this thesis independently, using only the sources listed, in accordance with Czech legal regulations and the internal regulations of the Masaryk University and the Faculty of Economics and Administration.

In Brno, May 2016

Author's signature

Acknowledgements

I would like to express my gratitude to doc. Mgr. Jiří Špalek, Ph.D. and Professor Hannu Laurila, my thesis supervisors, for professional guidance and useful critiques of my thesis and to Ing. Robert Jahoda, PhD. and Ms. Terhi Nieminen for providing me with the opportunity to study a double degree master program at the University of Tampere and their support during my studies. Furthermore, I would like to thank my family for emotional support.

TABLE OF CONTENTS

INTRODUCTION

Housing is perceived as a one of the basic human needs. The necessity of housing as "goods" is arguably perceived the most when affordability of housing is somehow threatened. The threat to housing affordability concerns especially low income groups and households vulnerable to social and spatial exclusion. For groups of inhabitants that for objective reasons are unable to secure their housing themselves, the State provides supportive instruments on the basis of its own housing policy.

A current document which defines the role of the State in the area of the housing policy, called *Housing policy concept of the Czech Republic till 2020,* sets housing affordability as its primary strategic objective. What is the situation with housing affordability among Czech households? Which household types are suffering the most from deteriorating housing affordability? And how is it possible to measure housing affordability?

In order to answer these questions, I will start with introducing the Czech housing market. It will be necessary to define which institutions are responsible for housing policy, what the basic characteristics of the housing market and crucial problematic areas regarding housing affordability are. It is important to realize that housing can be divided into two basic tenure types, owner-occupancy and rental housing. Distribution of households between owner-occupancy and rental housing can change as time goes and it is strongly influenced by government policy. The policy has an impact on decision making, whether the household becomes an owner or tenant on the housing market, so called *tenure choice*. In order to analyse the Czech housing market more thoroughly, I will deal with the changes carried out on the housing market in the long term. Particular attention will be focused on the *deregulation process* which affected tenure structure of the housing market. During the deregulation process households in regulated flats faced gradually increasing rents and they had to decide either to stay in a flat with higher living costs or become an owner. Rent regulation as a housing policy instrument should have been intended for low-income households to help them with the burden of high housing costs and increase housing affordability. However, as the study testing the efficiency of selected housing subsidies in the Czech Republic showed, rent regulation was almost equally applied to both "rich" and "poor" households. When regulated rent appreciation increased the probability of a real estate purchase for households currently living in rent-controlled apartments, it was

high-income households who had no problem becoming owners in spite of the fact that securing one's own housing presents a financially demanding investment. On the other hand, it was low-income households who stayed in rental housing with a higher market price of renting and there is the suspicion that the deregulation process worsens their housing affordability. ***In view of these facts, I chose as a main objective of my Master's Thesis the measurement of the housing affordability of Czech households within the context of housing policy changes, especially within the context of deregulation process.***

In order to analyse the housing affordability of Czech households more complexly, I decided to compare the Czech Republic with Finland. During the observed years when the Czech housing market was going through bigger changes in the form of the deregulation process, Finland was characterised by its stable situation. These differences together with different housing policy instruments could have an impact on different results concerning housing affordability. Therefore, the Finnish housing market will also be briefly introduced and analysed.

After defining the main objective of this thesis deriving from an introduction to the Czech housing market with its problematic areas, I will continue with the testing of financial factors and with measuring the impact of these factors on tenure choice (owner-occupied and rental households). Financial factors will represent the financial position of households with respect to housing costs and the ability to make ends meet. Testing can prove that problems concerning the burden of housing costs are more apparent for rental households, especially for Czech rentals.

The most important part of this thesis will serve the last chapter, where housing affordability will be tested through suitable measurements. In order to find the most suitable measurements, it will be necessary to research study papers concerning the housing affordability issue. Subsequently selected measurements will be applied to Czech and Finnish households and then it will be possible to determine how many households are currently considered unaffordable, what the development of housing affordability in the long term was and what the most burdened household types are.

In order to achieve the thesis's objective, it is necessary to work with suitable databases which will provide the required information. Therefore, EU statistics on income and living

conditions (EU-SILC) will serve as a main source of data.[1] The data should cover the whole time period necessary for decision-making about housing affordability development, which means the years 2006-2013. Since the data is confidential and contains sensitive information, the data in this thesis is represented in respect of legal restrictions specified by the Czech Statistical Office.

[1] Specifications of EU-SILC databases are provided in the Appendix

1 HOUSING IN THE CZECH REPUBLIC AND FINLAND

The aim of this chapter is to introduce the environment of the housing markets in the Czech Republic and Finland. The State plays an important role on these markets as a coordinator of housing policy which ensures the functioning of the market by its governmental instruments. For the purpose of this thesis, I will focus on the distribution of households by their tenure status and the impact of housing policy on decision making of a household regarding whether to become an owner or tenant and it will be discussed in this chapter.

1.1 Housing in the Czech Republic

1.1.1 Housing policy and competency

Role of the State

Housing is perceived as one of the basic human needs. The role of the state in this area is "*establishing a stable environment that reinforces responsibility of its citizens for themselves and fostering their motivation to meet their basic needs by means of their own efforts"*.[2]

There are people who are not able to ensure their own housing for objective reasons. The State, on the basis of the principle of solidarity, assists these people and uses its governmental instruments to intervene.

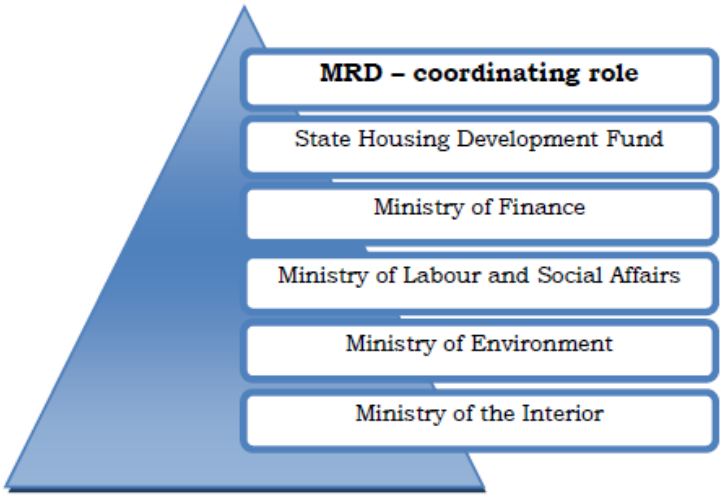
Under the institutional framework in the Czech Republic there is the Ministry of Regional Development which is responsible for housing policy and acts as a central State administration authority. The role of the Ministry is to ensure the functioning of the housing market which includes legal arrangements for owner-occupied, rented and cooperative housing and also the elimination of price and legal distortions in the sector of rented housing. The role of the Ministry is also to enlarge the offer of housing, betterment of the quality of housing and on-going monitoring of the housing market.[3]

The scope of competence in the area of housing policy is not made up only from the Ministry which cooperates with other central State administration authorities. Based on Act no. 211/2000 Coll., for the purpose of granting housing aid in compliance with the Government approved housing policy concept, the State Housing Development Fund was established. There are also other government departments which promote housing

[2] MRD. *Housing policy concept of the Czech Republic till 2020*, 2011. (p. 5)
[3] MRD. *Housing Policy*

with their programmes such as The Ministry of Finance (building savings scheme, tax reliefs), the Ministry of Environment (Green Savings), the Ministry of Labour and Social Affairs (social security allowance for housing, contribution for alteration of a flat, contribution for the remuneration for the use of barrier-free flat) and the Ministry of Interior (integration of asylum-seekers scheme).

Figure 1 Scope of competence in the area of housing policy



Source: MRD

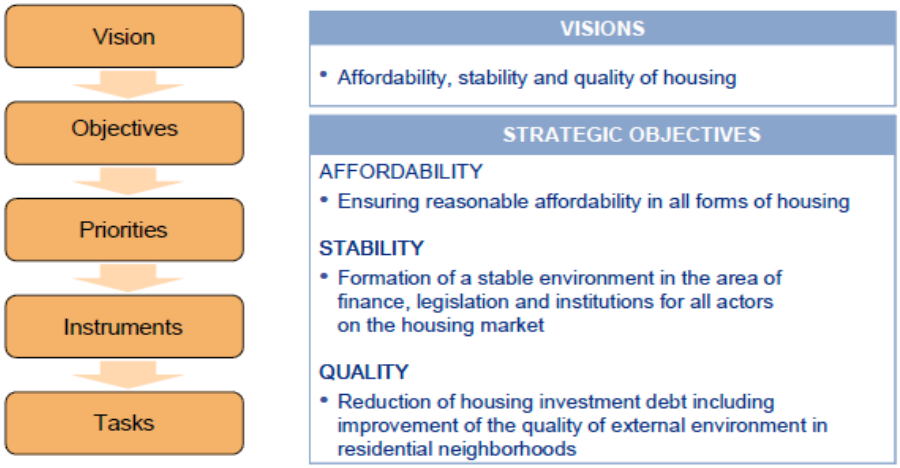
Housing policy concept

As a one of the basic strategic documents concerning the housing market and policy is the Housing Policy Concept of the Czech issued by the Ministry of Regional Development. The document presents a long-term strategy of housing policy until a certain period. Presently, it is a strategic document valid until the year 2020. The aim of the document is to present the current situation on the housing market, mapping out problematic areas and evaluation of financial situation, then comparison of experience with instruments of housing policy in the Czech Republic and abroad and the presentation of the instruments applied by the State to promote housing and their effectiveness. The document also evaluates a previous short-term strategic document determined for the years 2005-2010.

In order to achieve a particular outcome in housing policy, there are defined particular objectives. The current programme is focused on three fundamental objectives which are specified by their tasks and instruments: [4]

- *Affordability of reasonable housing*
- *Formation of a stable environment for the area of housing*
- *Permanent improvement of housing quality*

Figure 2 Vision of the State in the area of housing



Source: MRD

The government publishes an annual report assessing the success rate in achieving goals which have been set. In the previous report for the year 2014, tasks are valued as accomplished either totally or partially. Only one of the tasks is valued as incomplete and it is increasing the affordability of housing mainly concerning a particular target group of households.[5] And the worsening of housing affordability is only one of the crucial challenges of the concept of housing policy. Therefore it is useful to analyse housing affordability more thoroughly, which is also an objective of this thesis.

[4] MRD. *Housing policy concept of the Czech Republic till 2020*, 2011. (p. 87)
[5] MRD. *Report from the control of the performance of the state housing policy concept till 2020 for 2014*, 2015.

Housing policy instruments

Theory of housing economics presents many instrument types which are subsequently categorized into different groups. Supply and demand-side subsidies represent one of these categories of instruments.

Supply-side subsidies represent instruments focused on housing construction, restoration and modernization of existing housing stock. Subsidies lower investment cost of housing by either a one-time subsidy or gradually provided subsidies and so the provider of housing can lower the price of housing below the level of the market price.

Demand-side subsidies support the affordability of housing. They are most often intended for consumers with a low income or for households with varying social problems. The government provides contributions to housing or different types of tax breaks on interest rates from mortgages.[6]

Table 1 System of housing policy instruments in the Czech Republic

State authority	Instruments
The Ministry of Finance	The ministry provides financial assistance to the housing sector. The basic instrument is a building saving scheme with a subsidy credited to the account of a home building savings bank´s client to support savings. There is also the option to use reduced value-added tax in special cases as a construction in social housing or for repairs of existing housing. In case of direct taxes households have the option of deduction of interest paid on a housing acquisition loan.
The State Housing Development Fund	One of the basic programs provided by this fund is the programme PANEL which allows access to loans granted by banks and home building saving banks the repair and modernization of apartment buildings. The fund also supports the housing of young people (Program 150), modernization for municipalities (Programy Pro Obce) or construction of rental flats (Program Výstavby) and others.
The Ministry of Regional Development	The ministry secures technical infrastructure, construction of supported flats and regeneration of panel housing estates.
The State Environmental Fund of the Czech Republic	This fund disposes of money determined for programme focused on green savings (Nová Zelená Úsporám) which encourage the installation of renewable energy sources and construction in a passive energy standard.
The Ministry of Labour and Social Affairs	The ministry provides one of the most often used social allowances in housing policy concept, contribution to housing. The allowance is aimed at households with housing costs exceeding the amount of the multiple of the decisive income in the family. There is also a supplementary housing payment which helps people in material need.

Source: MRD

[6] DONNER, Christian. *Housing policies in the European Union*, 2002.

Table 1 outlines the current Czech system of housing policy instruments. The instruments are conducted by several state authorities and are oriented as both supply-side and demand-side subsidies. On the basis of the amount of money provided by state authorities (see Table 2), demand-side subsidies as a contribution to housing or building saving schemes account for a prevalent source of subsidy.[7] This fact has influenced tenure structure on the housing market in favour of the ownership rate.

Table 2 Government housing expenditures

Government housing expenditures (in millions CZK)	2008	2009	2010	2011	2012	2013	2014	2015
	reality	reality	reality	reality	reality	reality	reality	budget
Ministry of Regional Development-total	**461.98**	**557.94**	**562.61**	**457.95**	**517.23**	**398.97**	**479.64**	**625.61**
Regeneration of panel building settlements	181.66	183.02	149.98	231.30	180.42	142.39	194.10	111.00
Subsidies for construction of new rental housing and technical infrastructure owned by municipalities	89.46	101.07	94.64	37.35	34.37	22.03	13.00	21.85
Subsidies for construction of supported housing	118.57	120.58	165.73	124.24	257.36	192.26	241.53	426.77
Subsidies for mortgage loans	47.68	27.46	41.55	47.98	41.88	34.00	21.58	28.00
State Housing Development Fund-total	**2 772.26**	**2 005.32**	**1 902.00**	**1 384.38**	**1 029.17**	**1 267.56**	**1 706.78**	**1 959.30**
Programme Panel - Support to repairs of multi-dwelling buildings built by prefabricated slab technology	754.54	827.37	909.84	913.40	919.65	898.07	876.49	859.30
Credits to municipalities for repairing and modernization of flats	40.56	15.22	3.16	15.93	13.52	6.98	5.90	20.00
Subsidies credits to persons below 36 years	898.74	815.37	837.72	318.51	5 100.00	x	x	x
Credits for construction of flats by natural persons caused by floods	0.12	1.88	6.40	5.60	0.30	x	1.00	13.00
Ministry of Finance-total	**14 593.65**	**13 540.91**	**11 974.91**	**10 928.81**	**5 463.82**	**5 095.27**	**4 891.00**	**5 310.00**
Building savings subsidies	14 220.12	13 261.72	11 743.48	10 729.04	5 290.05	4 953.39	4 761.00	5 200.00
Ministry of Labour and Social Affairs-total	**2 166.75**	**2 860.20**	**4 270.22**	**5 556.35**	**7 781.10**	**11 004.60**	**12 898.20**	**14 350.00**
Housing contribution	2 091.84	2 791.58	4 207.12	5 491.20	7 405.60	10 216.70	12 092.80	13 500.00
Ministry of Interior-total (Safeguard Integration asylum seekers)	**8.84**	**15.65**	**12.12**	**16.06**	**15.98**	**16.82**	**9.56**	**20.00**
Ministry of Environment (State Environmental Fund-Green Savings programme)	**x**	**3.29**	**1 998.81**	**8 600.24**	**9 108.10**	**431.64**	**195.30**	**700.00**
Government housing expenditures-total	**20 003.00**	**18 983.00**	**20 721.00**	**26 943.00**	**15 239.00**	**18 215.00**	**20 180.00**	**22 965.00**

Source: MRD, SHDF, MF, MLSA, MI, ME.

[7] MRD. *Housing policy concept of the Czech Republic till 2020*, 2011. (p. 23)

Housing policy development

The current situation of the housing market has been significantly affected by initial housing policy and position after 1989 when the housing sector began to undergo a transformation process from an administration flat allocation system to a market-based system. An underlying process during the transformation period was the restitution of part of the housing stock.

If the legal terms for the restitution of property were satisfied, the property was returned to the original owner, their heirs or immediate relatives. It is estimated that it was around 6-7 % of the housing stock in the Czech Republic. Ownership structure was affected mainly in large city centers where there was the biggest concentration of privatised flats.

Decentralisation of the housing market after 1989 included also the transfer of the housing stock from state to municipal ownership (approximately 39 % of the Czech housing stock) for the purpose of creating local housing policy. Income collected from rent was not enough to cover maintenance costs, which created additional burdens on municipal budgets. This situation led to a continuation of long-term under-investment in the housing fund and municipalities started to privatise housing to its inhabitants, mainly by offering it to sitting tenants. The considerable role played by housing cooperatives, which were established by building tenants for the specific purpose of privatization since privatization, has been in the form of the sale of whole buildings. Since 1994 it has been permitted to divide buildings into separate housing units and to privatise it directly to tenants.[8]

Another problem started after the WWI when the Czech housing market faced the threat of a shortage of flats and there occurred concern about increasing prices which led to the introduction of rent regulation. This situation persisted in a similar way almost till 2006 because the first-generation rent regulation was inherited from the communist period when the strong tenant protection was legally introduced in the Civic Code.[9] Private owners did not have the revenue subsidies to cover costs of maintenance, and they were practically unable to increase the rent to a level sufficient enough to cover the necessary maintenance costs due to poor legislation. The first gradual rent deregulation attempt was launched

[8] LUX, Martin. *Housing policy and housing finance in the Czech Republic during transition: an example of the schism between the still-living past and the need of reform*, 2009.
[9] Act no. 40/1964 Coll., the Civil Code
Government Regulation no. 60/1964 Coll. On Payments for Use of Flats and Services Related to the Use of Flat

at the beginning of the 1990s when the maximum monthly rent increased every year according to the quality of a flat, size of municipality and inflation rate. In 1999 the government froze nominal rent values and then in 2002 rent was frozen at real value. In 2006 the difference between regulated and market rents meant that regulated prices were around three times lower than their market counterparts for the same dwelling. The unsustainable situation on the housing market led to the passing of the One-Sided Increase of Rent for Flat Act (Act no. 107/2006 Coll.) which allowed gradual increases in regulated rents from the beginning of 2007. The Act presented the second phase of the deregulation process when the government wanted to increase regulated rents to their market values up to the end of 2011. The Czech housing rental market is currently unregulated.[10]

As for the housing construction after 1989, disappeared capital subsidies for new state rental housing construction and liberalised prices of construction materials led to the sharp decrease in housing construction volumes. The situation changed after 1996 when construction output started to grow again.[11] The biggest drop was recorded in shared of municipal and rental housing construction.

In spite of the decline in housing construction, the number of permanently inhabited dwellings per 1,000 inhabitants increased which could signify that the housing market was relatively satisfied (the ratio is even higher than in some old EU member states). However, there is another indicator measuring the housing conditions, where the Czech Republic had the real deficit - the average size of the total dwelling floor area per inhabitant. The indicator showed that the Czech Republic was far behind the advanced countries of Western Europe which meant a real challenge for housing policy makers in the changing socio-economic environment.[12]

[10] LUX, Martin. *Housing policy and housing finance in the Czech Republic during transition: an example of the schism between the still-living past and the need of reform*, 2009. (p. 98-110)
[11] CSO. *Housing construction in the Czech Republic between 1997-2011*, 2013.
[12] LUX, Martin. *Housing policy and housing finance in the Czech Republic during transition: an example of the schism between the still-living past and the need of reform*, 2009.

1.1.2 Tenure structure

Home ownership

The home ownership rate accounts for approximately 56 % of overall housing stock in the Czech Republic.[13] The rate of this sector has rapidly increased (mainly in the privately owned flat sector) over the last few decades and it was mostly because of governmental demand-side subsidies, cooperative housing and privatisation of municipal housing into ownership of tenants.[14]

Table 3 Tenure structure change between 1991 and 2011

Tenure structure change between 1991-2011	1991		2001		2011	
	Abs.	**In (%)**	**Abs.**	**In (%)**	**Abs.**	**In (%)**
Privately owned house	1 367 027	*36.9*	1 371 684	*35.8*	1 470 174	*35.8*
Privately owned flat	31 164	*0.8*	421 654	*11.0*	824 076	*20.1*
Rental (municipal and private)	1 465 231	*39.5*	1 092 950	*28.6*	920 405	*22.4*
Co-operative housing	697 829	*18.8*	652 028	*17.0*	385 601	*9.4*
Other and undetermined	144 430	*3.9*	289 362	*7.6*	504 379	*12.3*
Permanent-residence housing units	**3 705 681**	***100.0***	**3 827 678**	***100.0***	**4 104 635**	***100.0***

Source: CSO, final results of the 1991, 2001 and 2011 census

According to the distribution of households by tenure type, 78. 9 % of households in the Czech Republic had their own housing and 60. 7 % of households did not have an outstanding mortgage or housing loan in 2014 (see Table 4). When we compare these ratios on the basis of distribution of population by income group, households below 60 % of median equivalised income which have their own housing accounted for only 57. 4 %.[15] This demonstrates that for low-income households it is a less viable option to have their own housing due to financial affordability.

[13] CSO. *Population and Housing Census: 2011*, 2015.
[14] POLÁKOVÁ, Olga. *Bydlení a bytová politika*, 2006. (p. 87)
[15] EUROSTAT. *Distribution of population by tenure status, type of household and income group: (EU-SILC)*, 2015.

Table 4 Distribution of population by tenure status-owners

Distribution of population by tenure status (%)	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
OWNER-total	**73.5**	**74.1**	**74.5**	**75.8**	**76.6**	**78.7**	**80.1**	**80.4**	**80.1**	**78.9**
with mortgage or loan	9.9	10.7	11.3	11.9	13.4	17.5	18.1	18	18.2	18.2
no outstanding mortgage or housing loan	63.6	63.4	63.2	63.9	63.2	61.3	61.9	62.4	61.9	60.7
OWNER- below 60% of median equivalised income	**52.7**	**53.6**	**49.3**	**54.2**	**51.9**	**57.5**	**64.4**	**62.8**	**63.1**	**57.4**
with mortgage or loan	6.9	7.2	5.9	5.8	4.8	8.6	13.9	7.8	9.9	9.6
no outstanding mortgage or housing loan	45.8	46.5	43.4	48.4	47.2	48.8	50.4	55	53.2	47.7

Source: EU-SILC

On the basis of governmental funding of housing the Czech housing policy is significantly focused on demand-side subsidies, one of which is housing savings scheme with the purpose of offering low-interest and available credits for housing purchases, modernisation and increase in affordability of housing loans. The instrument is granted by MF on the basis of Act no. 96/1993 Coll., on Building Savings Scheme and on State Aid to Building Savings Scheme. As we can see in Table 5, loans provided with state subsidy are merely currently a supporting instrument and mortgages have become the prevalent way of funding housing. The popularity of the housing savings scheme has decreased following the financial crisis, and in 2014 it accounted for approximately 8. 5 % of total loans for housing. The situation has been affected also by the development of annual interest rates on the Czech loans for housing, when rates on building society loans have stayed at the same level, whilst rates on mortgage loans decreased from 5. 27 % in 2007 to 2. 30 % in 2015 on an average.[16]

[16] CNB. *Harmonisation of monetary and financial statistics: data*, 2015.

Table 5 Loans to households-inhabitants for housing by the end of mentioned period-total (CZK mil.)

	Households - inhabitants - loans for housing to inhabitants total	of which		
		mortgage loans	building society loans	other loans on real estate
2007	**510 945**	333 901	150 705	26 338
2008	**613 590**	397 362	186 691	29 537
2009	**684 297**	554 397	103 628	26 273
2010	**728 141**	604 667	102 921	20 553
2011	**772 866**	659 001	90 963	22 903
2012	**809 971**	700 488	85 705	23 778
2013	**852 320**	746 607	81 067	24 646
2014	**899 991**	796 884	78 069	25 039

Source: CNB

Rental housing

As Table 6 shows, rental housing accounted for 21. 1 % in 2014 and this sector is gradually decreasing in favour of ownership housing. When considering only households below 60 % of median equivalised income, the ratio is much higher (42. 6 % in 2014). Own housing is a costly investment and low-income households do not have enough resources to afford it and so these households are remaining in rental housing. When we compare the situation of the housing market in 1991 with the present state, we could see in *Cenzus 1991* that the rental sector accounted for almost 40 %. As was already mentioned, the increasing ownership sector was affected by a housing policy which is demand-side oriented and in the past it was mainly the restitution of housing stock. According to a Local Government and Housing Survey conducted among municipalities in 2001, nearly all municipalities were involved in the privatisation of municipal housing.[17]

[17] LUX, Martin. *Housing policy and housing finance in the Czech Republic during transition: an example of the schism between the still-living past and the need of reform*, 2009. (p. 107)

Table 6 Distribution of population by tenure status-tenants

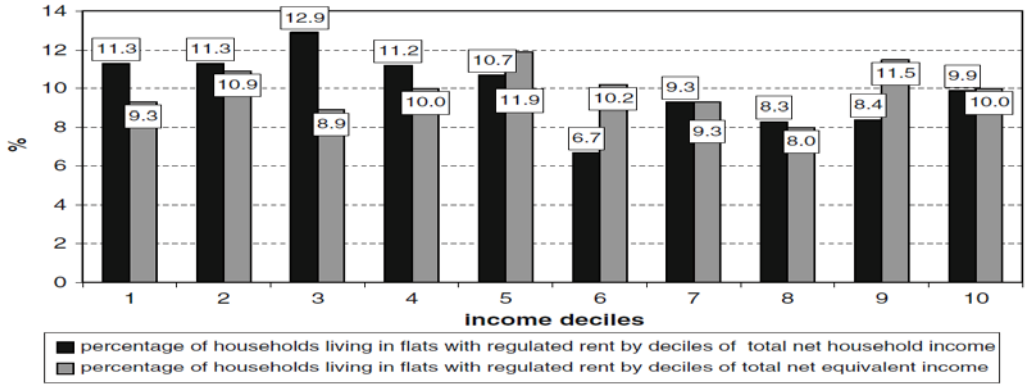
Distribution of population by tenure status (%)	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
TENANT	**26.5**	**25.9**	**25.5**	**24.2**	**23.4**	**21.3**	**19.9**	**19.6**	**19.9**	**21.1**
rent at market price	4.9	4.7	4.8	5	5.4	5	13	13.2	16	16.6
rent at reduced price or free	21.6	21.1	20.7	19.2	17.9	16.2	6.9	6.4	3.9	4.5
TENANT- below 60% of median equivalised income	**47.3**	**46.4**	**50.7**	**45.8**	**48.1**	**42.5**	**35.6**	**37.2**	**36.9**	**42.6**
rent at market price	9.4	12.3	13.2	11.7	13	12.2	28.7	28.7	31.4	35.1
rent at reduced price or free	37.9	34.1	37.5	34.1	35.1	30.3	6.9	8.5	5.6	7.5

Source: EU-SILC

The rent deregulation also contributed to the current tenure structure on the housing market. When households in regulated flats faced gradually increasing rents, they had to decide either to stay in a flat with higher living costs or become an owner. As one study has shown, regulated rent appreciation increased the probability of a real estate purchase for households currently living in rent-controlled apartments.[18] There is a concern whether these households had funds for more expensive rents or their own housing, because rent regulation as a governmental instrument was established primarily for lower-income households. But as the following chart shows, rent regulation was almost equally applied to both "rich" and "poor" households. This demonstrates that part of the households, those with a high household income, had little problem becoming owners in spite of the fact that owning one's own home presents a financially demanding investment. On the other hand, it was low-income households who remained in rental housing with a higher market price of renting and there is an indication that the deregulation process worsened their housing affordability.

[18] TSHARAKYAN, Ashot a Petr ZEMČÍK. *Rent deregulation, tenure choice, and real estate price expectations*, 2011.

Figure 3 The percentage of households "profiting" from regulated rent



Source: Lux: Effectiveness of selected housing subsidies in the Czech Republic, 2009.

1.1.3 Social Housing

Social housing is secured mainly by two housing contributions: *Housing allowances and Supplements for housing* as an assistance in material need provided my MLSA.[19] Table 7 shows the development in volume of paid finances for housing allowance and supplement for housing, and we can see that housing allowances accounts for a prevalent part of the provided subsidies.[20]

Table 7 Volume of paid finances for housing allowance and supplement for housing

	2007	2008	2009	2010	2011	2012	2013	2014
Housing allowance *costs (in millions CZK)*	**1564.8**	**1619.2**	**2280.0**	**3521.0**	**4640.5**	**5732.3**	**7403.6**	**8843.6**
average monthly number of paid benefits in thousands	115.0	85.8	94.2	119.5	140.7	162.5	194.1	219.5
Supplement for housing *costs (in millions CZK)*	**523.5**	**482.6**	**511.6**	**686.1**	**850.2**	**1673.3**	**2813.6**	**3249.2**
average monthly number of paid benefits in thousands	25.2	20.8	19.5	23.2	26.1	43.6	65.1	69.8

Source: MLSA

[19] MLSA. *State Social Support*
[20] MRD. *Selected Data on Housing: 2014*, 2015.

Social housing is also secured by the supported construction of social dwellings from MRD and State Housing Development Fund. Since 1998, approximately 20 thousand social dwellings were built with the help of these institutions. Social dwellings are intended especially for selected groups of weak or endangered citizens.[21]

However, these instruments are not determined by a complex concept of social housing or by an Act on social housing. As housing concepts have shown, there are many important social problems in the area of housing which indicates that social housing in the Czech Republic is not sufficient and there is a necessity of new concepts and legislation. Thus, main social problems have been determined: households overburdened by housing costs, ineffective public finance transfers, discrimination of some social groups, increasing number of homeless people and people at risk of poverty and especially the missing definition of social housing in legislation.[22]

In view of these problems the government is now working on new legislation of social housing based on the new Social housing concept of the Czech Republic 2015-2025. The regulation will define and divide social housing into three tiers. The first tier will be intended for people who are in acute need of housing, so called "housing in crisis or asylum housing" as a new type of social service. The second tier will be provided by municipalities as "social flats". Social flats will represent a lower standard housing where tenants will be supervised by a social worker. The third tier will be also be provided by municipalities as "affordable flats" represented by standard quality dwelling.[23]

Housing allowances

Housing allowance in the Czech Republic contributes to coverage of excessive housing costs paid by low-income households. Owners or tenants are entitled to housing allowance if they are registered as permanently resident in the property and if their housing costs are higher than 30 % (35 % in Prague) of the household income, while at the same time housing costs have to be lower than the relevant prescriptive costs set by law. If the real housing costs are higher than the relevant prescriptive costs, for the computation the relevant prescriptive costs will be used.

[21] MRD. *Selected Data on Housing: 2014*, 2015.
[22] MRD. *Housing policy concept of the Czech Republic till 2020*, 2011.
[23] Op. Cit.

The prescriptive housing costs are based on the number of members of the households and the size of the municipality. They represent average housing costs together with the costs of services and energy, and include rent and costs for residents of cooperative flats and flat owners.

The level of housing allowance is set as the difference between the prescriptive housing costs (or the real housing costs) and the relevant household income multiplied by a coefficient of 0. 30 (in Prague 0. 35).[24]

*The level of housing allowance= real (prescriptive) housing costs – (0. 3 (or 0. 35) * relevant family income)*

Table 8 The prescriptive housing costs for tenants effective from 1.1.2016 to 31.12.2016 (in CZK/monthly)

Household size	Municipality size				
	Prague	100 000 and more	50 000 - 99 999	10 000 - 49 999	less than 9 999
1	7 731	6 146	5 858	4 996	4 811
2	11 114	8 945	8 551	7 372	7 119
3	15 114	12 277	11 762	10 220	9 890
4 and more	18 947	15 526	14 905	13 046	12 648

Source: MLSA

Table 9 The prescriptive housing costs for cooperative flats and owners effective from 1.1.2016 to 31.12.2016 (in CZK/monthly)

Household size	Municipality size				
	Prague	100 000 and more	50 000 - 99 999	10 000 - 49 999	less than 9 999
1	4 484	4 484	4 484	4 484	4 484
2	6 703	6 703	6 703	6 703	6 703
3	9 316	9 316	9 316	9 316	9 316
4 and more	11 887	11 887	11 887	11 887	11 887

Source: MLSA

[24] MLSA: *Housing allowance*, 2016.

The role of housing allowance in the Czech Republic has been increasing in recent years (from 1 564. 8 million CZK in 2007 to 8 843. 6 million CZK). In 2014 the average monthly housing allowance was 3 371 CZK. The average housing allowance and number of households entitled to the housing allowance also have the tendency to increase. More than half of the allowance is directed to tenants.[25]

Discussion

On the Czech housing market it is possible to observe several changes. The distribution of households according to their tenure status has been deflected towards the home ownership. It was demand-side oriented housing policy and the deregulation process which has contributed to this state. During the deregulation process households were facing the choice of whether to stay in a flat with increasing rent or became a homeowner. A crucial role here was played by the financial situation of households since home-ownership represents an expensive investment which not every household can afford. The social benefits of regulated rent should have been intended mainly for low-income households. However, as Lux's study shows, rent regulation was almost equally applied to both "rich" and "poor" households. Therefore, we can assume that during the deregulation process only high-income households could afford to become homeowners while low-income households have remained on the rental market. In order to assist with difficulties in housing affordability on the rental market, housing policy often uses social housing as a housing policy instrument. But social housing accounts for only a negligible part of the rental market in the Czech Republic. Therefore, there is concern about the financial situation of rental households.

[25] MRD. *Selected Data on Housing: 2014*, 2015.

1.2 Housing in Finland

1.2.1 Housing policy and competency

Finnish housing policy with its housing policy strategies, housing legislation, budget planning and housing subsidy systems is the responsibility of **the Ministry of the Environment**. The main goal of the Ministry is to meet people's housing needs and to maintain the proper functioning of the real estate market.[26] The operative function of the Ministry secures **The Housing Finance and Development Centre of Finland (ARA).**

The role of ARA is the implementation of Finnish housing policy through granting subsidies, grants and guarantees for housing and construction and controls of the use of the ARA housing stock. Of approximately 800, 000 rental homes in Finland, slightly more than half have been constructed with the help of state subsidies through ARA construction with aim to provide safe housing conditions for residents, at a reasonable cost. Through steering and monitoring, ARA ensures that state subsidies are efficiently allocated to residents and that corporations managing residential buildings operate according to the regulations and rules.[27]

The municipalities also play a crucial role in the housing sector. They decide on the land use, provide the infrastructure and they are also the largest owners of social housing (approximately 60 % of total).[28]

1.2.2 Tenure structure

Households and individuals in Finland have four alternatives of housing. **Owner-occupied housing** accounts for approximately 67 % from all 2. 6 million household-dwelling units, demonstrating that the Finnish housing system is strongly based on owner-occupied housing. Ownership is characterized by accepting reasonable loans. Finnish households buy small apartments and then invest gradually into bigger housing units. They finance their own housing through Nordic commercial banks.

There is also **rental housing** on the private market, social housing for low-income households and housing for special groups such as elderly people, students, homeless or refugees.

[26] MINISTRY OF THE ENVIRONMENT. *Housing*, 2013.
[27] ARA. *About ARA*, 2013.
[28] TÄHTINEN, Timo. *Financing Social Housing in Finland*. (p. 22-26)

Whilst these tenure types are also known in the Czech Republic, there are two more alternatives in Finland. **Right-of-occupancy housing** represents an alternative to rental and owner-occupied housing with some elements of social housing. If a household wants to have the right to live in a right-of-occupancy dwelling they have to first pay a right-of-occupancy payment for it. The payments is 15 % of the price of the dwelling. Residents also pay a monthly payment based on the actual costs (similar to cost rent). The charge for use may not exceed the level of the rent paid for similar dwelling in the same area and there is also the condition that dwellings cannot be transformed to owner occupancy. If households cannot afford the right-of-occupancy payment themselves, they have the option to obtain a loan from a bank and the loan interest is deductible from their taxation. There are no income criteria and applicants to right-of-occupancy receive a queue number when they intend to live in this kind of housing. The advantage of right-of-occupancy is that the dwelling does not involve financial risks and it is a safer option than owner-occupied housing. When household wants to move out, they do not have to sell the dwelling and they can also live in a right-of-occupancy dwelling for as long as they want because the house owner cannot terminate the contract, which makes right-of-occupancy housing a more permanent type of housing than a rental one.[29]

Part-ownership as a relatively new tenure form was introduced in 2002 and represents state subsidized social housing. This tenure form offers the positive possibility of obtaining a dwelling if the household cannot afford to buy one immediately. The household must pay from 10 to 20 % of the accepted dwelling price as an initial payment and they can then apply for a bank loan to pay this payment. In the meantime the household lives as tenants in the dwelling, paying rent for the owner based on a cost recovery principle. Later, but no earlier than 5 years and at the latest after 12 years, the household can acquire the ownership of the dwelling for a prefixed price (80 % of the accepted dwelling price). Unlike right-of-occupancy housing, the households are selected on the basis of social appropriateness and financial need. Income limits are considered which are higher than in the case of social rental dwellings.[30]

From these tenure forms, ARA's stock of buildings consists of rental (70 %), right-of-occupancy (10 %) and part-ownership housing (20 %).

[29] INFOPAKKI. *Right-of-occupancy dwelling*, 2015.
[30] INFOPAKKI. *Part-ownership dwelling*, 2015.

According to EU-SILC statistics, Finnish households are distributed by tenure status in favour of ownership housing (73. 2 % in 2014). Although Finland recognises four tenure types, EU-SILC statistics classify households living in part-ownership as owner-occupied households and on the other hand, right-of-occupancy housing is perceived as rental housing. What is important here is the fact that the distribution of households by tenure status is stable during the long term. Unlike the Czech Republic, where social housing accounts only negligible part, more than half of Finnish rental households are paying rent at a reduced price or free because of a strong social housing system.

Table 10 Distribution of population by tenure status

Distribution of population by tenure status (%)	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
OWNER	**71.8**	**73.3**	**73.6**	**73.2**	**74.1**	**74.3**	**74.1**	**73.9**	**73.6**	**73.2**
with mortgage or loan	39.2	41.1	41.8	43.2	43.7	42.0	41.9	42.2	42.6	43.0
no outstanding mortgage or housing loan	32.6	32.1	31.8	30.0	30.4	32.3	32.2	31.7	31.0	30.1
TENANT	**28.2**	**26.7**	**26.4**	**26.8**	**25.9**	**25.7**	**25.9**	**26.1**	**26.4**	**26.8**
rent at market price	10.7	9.7	9.8	10.1	10.4	10.1	10.2	10.5	10.7	10.9
rent at reduced price or free	17.5	17.1	16.5	16.8	15.4	15.6	15.7	15.6	15.7	16.0

Source: EU-SILC

1.2.3 Social housing

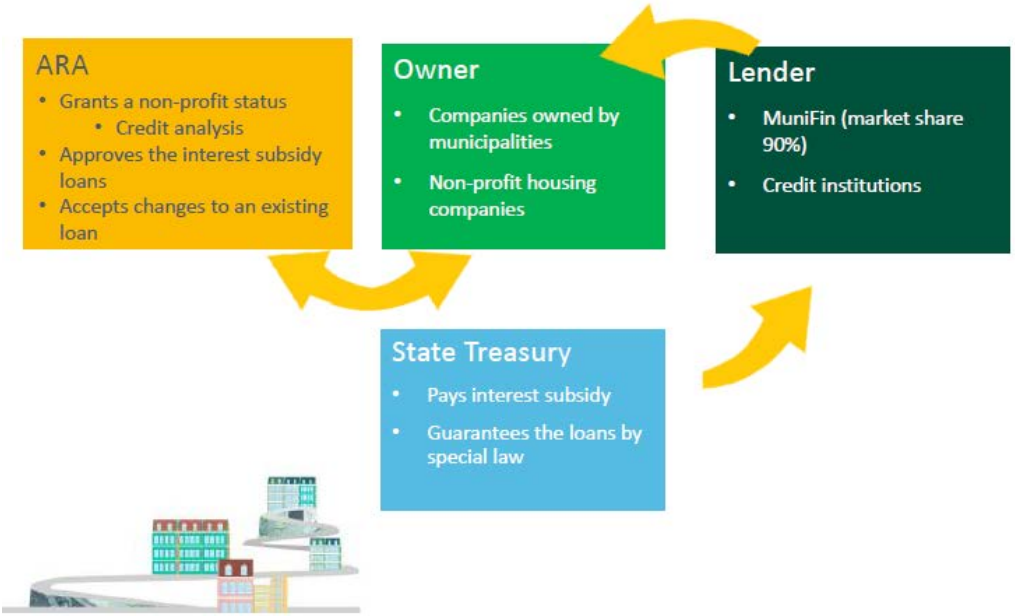
Social housing in Finland is financed either with state housing loans or interest subsidized commercial loans. ARA accepts the loan (ARAVA loans), gives the loan a state guarantee and pays the interest subsidies. More than a half of Finnish rental homes have been constructed using state subsidies granted by ARA. The interest subsidy loan covers a maximum of 90-95 % of building costs and the price of the plot. ARA makes a decision on the approval of interest rates and the loan must be based on competition.[31]

The third largest credit institution in Finland-**MuniFin** finances most of the subsidized housing production and is by far the most important credit institution financing state-subsidized housing projects. MuniFin is owned by the municipalities, the municipal pension fund called Keva and by the Republic of Finland. MuniFin can finance municipalities and their corporations, housing companies and non-profit organisations granted by ARA.

[31] ARA. *Loans: Interest subsidy loans*, 2013.

MuniFin is sourced from the international capital markets and not from the deposits of its customers. Their housing loans are unique in Finland since the company can offer long-term loans to their housing costumers with a maturity of up to 41 years. Housing loans account for 43 % of MuniFin's lending portfolio.[32]

Figure 4 Interest payment subsidy system for rental housing



Source: MuniFin

The borrowers and providers of social rental housing are:

1) *Local authorities or other public corporations (principally Finnish municipalities)*
2) *Other corporations that fulfil certain regulations*
3) *Limited liability companies in which organisations mentioned above have direct dominant authority*

Social appropriateness and financial need are the most important criteria for the selection of tenants in social rental dwellings. Tenant selection procedures are also partially determined by the municipalities. Priority is given to homeless applicants and to applicants with urgent need of housing.[33]

[32] MUNIFIN. *Municipality Finance*
[33] ARA. *Loans: The Borrowers*, 2013.

Providing social housing and framework is set by the ARAVA Act. The Act defines general provisions as types of ARAVA loans, authorization and funding of ARAVA loans, loan authorities and general conditions for granting.[34]

Social housing in Finland had to face the economic recession in the 1990s, but it has still been possible to maintain state-subsidised housing production at a high level thanks to **Securitisation**. Although the Housing Fund is separated from the state budget, the Fund has not been immune to changes in economy influenced by recession and it was necessary to consider other ways of raising funds for ARAVA lending. Therefore, the Housing Fund (ARA) utilised the credit of their ARAVA loan portfolio as collateral for the funding and the new funding instrument is not counted in the state debt. The securities are rated with the highest credit rating, AAA.[35]

Housing Allowances

Housing allowance is an instrument with the aim of helping low-income households with their housing costs.[36] Housing allowance in Finland is provided by Kela, which represents an independent social security institution supervised by the Finnish parliament.[37] Housing allowance is divided into three types of social benefits: General housing allowance, Housing allowance for pensioners and Housing supplement for students.

The housing allowance is determined by reference to three factors: the number of adults and children in the household, the municipality in which the household is located and the monthly household income before taxes. A household is referred to as the group of persons sharing living quarters (from one to several persons). Housing allowance is paid to the household collectively. This social benefit is available to persons living in Finland and foreigners if they are covered by the Finish social security system. As housing is referred to as rental, right-of-occupancy, partial-ownership and owner-occupied homes. The size, age or standard of equipment is not relevant to the payment of housing allowance. Kela pays housing allowance only for acceptable housing costs which are defined separately

[34] FINLAND. *ACT ON STATE-SUBSIDIZED HOUSING LOANS (ARAVA LOANS)*. Ministry of the Environment, year 1993.
[35] TULLA, Sirpa. *Securitisation and Finance for Social Housing in Finland*, 1999.
[36] KELA. *General Housing Allowance*, 2015.
[37] KELA. *The Social Insurance Institution of Finland*

for different types of housing. In cases where acceptable housing costs exceed a maximum limit for housing costs, only costs up to the maximum limit are recognised.[38]

Table 11 Maximum allowable housing costs in 2016 (in €/monthly)

	Municipality size			
Household size	I	II	III	IV
1	508	492	411	362
2	735	706	600	527
3	937	890	761	675
4	1 095	1 038	901	804
+ each additional person	137	130	123	118

Source: Kela

The household's monthly gross income affects the amount of housing allowance. Housing allowance is not affected at all if income does not exceed the following amounts.

Table 12 Limit of gross income when there is no basic deductible

Household size	Number of adults	Number of children	Limit of gross income (EUR/month)
1	1	0	**726**
2	1	1	**949**
2	2	0	**826**
3	1	2	**1 172**
3	2	1	**1049**
3	3	0	**926**
4	1	3	**1 395**
4	2	2	**1272**
4	3	1	**1149**
5	1	4	**1 618**
5	2	3	**1495**
5	3	2	**1372**
6	1	5	**1 841**
6	2	4	**1718**
6	3	3	**1595**
7	1	6	**2 064**
7	2	5	**1941**
7	3	4	**1818**
8	1	7	**2 287**
8	2	6	**2164**
8	3	5	**2041**

Source: Kela

[38] KELA. *Types of housing and housing costs*, 2014.

There are also upper limits which are applicable if the household's gross income exceeds the limits set in the following table and the household does not have the right to housing allowance.

A household's income is adjusted by earning a deduction of 300 € which was introduced on 1st September 2015. When the amount of the housing allowance is calculated, the sum of 300 € will be deducted from monthly income and the earnings deduction is made separately for each household member. Income is also adjusted by a basic deductible with the following formula:[39]

$$0.42 \times [T - (603 + 100 \times A + 223 \times L)]$$

T = the combined income of the household

A = the number of adults

L = the number of children

603 is the standard amount in euros.

The level of general housing allowance is computed as 80 % of the difference between the acceptable housing costs and the basic deductible. The maximum allowable housing costs are used if the maximum acceptable amount of housing costs exceeds the maximum allowable housing costs.[40]

Housing Allowance = [Reasonable housing costs (or maximum allowable housing costs) – basic deductible] x 0. 80

At the end of the year 2015, the average monthly housing allowance was 330. 42 €. Overall expenditures on general housing allowance were 917 619 706 € in 2015 and overall yearly expenditures has been increasing as the time goes on (for instance in 2006 it was 439 417 059 €). According to the type of tenure, a prevalent part of overall expenditures was directed to rental dwellings.[41]

[39] KELA. *Income*, 2015.
[40] KELA. *Amount and taxation*. *Kela*, 2015.
[41] KELA. *Statistics on general housing allowances*, 2014.

Discussion

As it has turned out, housing policy in Finland is a comprehensive instrument ensuring housing affordability. Elements of social housing can be found not only in the form of social rental housing, but also in the other two tenure types, which are unknown in the Czech Republic, the right-of-occupancy and part-ownership, where the tenant pays rent based on the cost recovery principle. Subsidized loans play an important role in the construction and provision of affordable housing. ARA oversees the efficiency in provision of subsidized loans and presents off-budget fund with the task to effectively allocate so called ARAVA loans governed by a separate statute (ARAVA Act). The importance of this fund demonstrates the fact that more than half of all rental homes are constructed with the help of these state subsidies. Unlike the Czech Republic, the Finnish municipalities play an important role in providing social housing, since they are the largest owner of social housing. Finnish municipalities have founded the third largest credit institution (MuniFin) financing state-subsidized housing projects. MuniFin is efficiently sourced from the international capital markets and not from deposits of its customers. Finland had to face the impacts of the economic downturn in 1990s, but they were able to resolve the lack of funds by securitisation of ARAVA loans on the financial markets and we can see how efficiently the housing system can work.

2 IMPACT OF FINANCIAL FACTORS ON TENURE CHOICE

Tenure choice is influenced by numerous factors. One group of factors influencing tenure choice is financial. Financial factors are selected to show potential problems with housing costs as a burden for owner-occupied and rental households. In the first chapter, the main problematic areas of the Czech housing market were outlined and we could see that the shrinking rental market seems to be more burdened by housing costs than the owner-occupied market. In order to prove this hypothesis, it is necessary to divide households in two categories - owners and tenants - and then to test the impact of financial factors on the probability of being an owner or tenant. The probit model will serve as an econometric model to test the hypothesis. By proving the hypothesis it can be shown that there are differences between tenure types regarding their financial position. Therefore, it will be more suitable to measure housing affordability separately for owners and tenants. Results for the Czech Republic will be compared with Finland to highlight differences between the financial position of the Czech and Finnish households.

2.1 Probit model

According to Wooldridge (2016) the probit model refers to a type of regression analysis with a dependent variable which can only take two values, the so-called binary response model. In the binary response model, interest lies in the response probability, where **x** denotes the full set of explanatory variables.

$$\mathrm{P}(y = 1|\mathbf{x}) = \mathrm{P}(y = 1|x_1, x_2, \ldots, x_k)$$

$$\mathrm{P}(y = 1|\mathbf{x}) = G(\beta_0 + \beta_1 x_1 + \ldots + \beta_k x_k) = G(\beta_0 + \mathbf{x}\boldsymbol{\beta})$$

In a class of binary response models of this form, **G** is a function taking on values between zero and one. **G** is the standard normal cumulative distribution function expressed as an integral:

$$G(z) = \Phi(z) \equiv \int_{-\infty}^{z} \phi(v)\mathrm{d}v$$

Where Φ (z) is the standard normal density

$$\phi(z) = (2\pi)^{-1/2}\exp(-z^2/2)$$

The primary goal of this model is to explain the effect of the $\mathbf{x_j}$ on the response probability. The probit model employs a probit link function and is using the standard maximum likelihood procedure.[42]

The values of β_K coefficients express the effect of explanatory variables on tenure choice (choice corresponding to becoming an owner or tenant). As a default choice is set to be homeowner and positive values of β_K coefficients indicate a greater likelihood of choosing homeownership.

2.1.1 Variables

The list of variables proceeds from the official description of target variables provided by Eurostat and a complex description can be found in the Appendix.

Response variables are defined by two tenure categories - owners and tenants -since I assume that there are differences between tenure types regarding their financial position.

The selected **explanatory variables** can be divided in two groups: subjective and objective variables. Subjective variables refer to the respondent feeling about a household's situation concerning their housing costs. The variable *Ability to make ends meet (AMEM)* inquires whether the household feels burdened with problems making ends meet. The variable *Financial burden of the total housing cost (FBTHC)* inquires whether the household feels that their total housing cost represents a financial burden for them. The variable *Arrears on utility bills (AUB)* ascertains the household's experience with arrears. These three variables can directly reveal the potential financial burden of a household, and according to hypothesis it is anticipated that in the case of Czech rental households the model will show a higher probability. From the subjective variables there are also variables inquiring what the household can afford. The variable *Capacity to afford a meal with meat, chicken, fish (or vegetarian equivalent) every second day (CAM)* is focused on household's ability to afford the price of meat, which may be perceived as a more financially demanding meal. It is assumed that housing has the first claim on the household budget and following these other expenditures are met by the remaining budget. So, if the household is more burdened with housing costs, their residual income might be too small to afford some goods

[42] WOOLDRIDGE, Jeffrey M. Introductory econometrics: a modern approach. *Introductory econometrics: a modern approach / Jeffrey M. Wooldridge*. 2016.

and services, and so for instance a meal with meat may again reveal the potential financial burden placed upon the household. But the results depend on the real perception of meat as more demanding goods. The variable *Capacity to afford paying for one week annual holiday away from home (CAH)* is focused on a household's ability to afford a family holiday. Paying for a holiday is even more demanding compared to meals with meat and here is anticipated the same residual income principle. The last subjective variable *Capacity to face unexpected financial expenses (CFUFE)* points out the financial stability of a household budget. According to the hypothesis, there is anticipated that a household's ability to be prepared for unexpected financial expenses is more likely for owner-occupied households.

Objective variables do not measure the respondent feeling, but they are focused on actual information about housing costs and household income which are not influenced by a household's perception. The variable *Total housing costs (THC)* can show that higher housing costs are more likely for particular tenure type. According to the hypothesis it should be a greater likelihood for rental households. The variable *Total disposable household income (DI)* was also selected to show that higher household income is more likely for particular tenure type and according to the hypothesis it should be owner-occupied households.

2.2 Results for Czech Republic

The required information concerning the financial position of Czech households is provided by EU-SILC survey databases. For the computation data for the years 2006-2013 was used which enables the observation of the development of financial factors over time. The total number of households representing the situation of the Czech households has increased to approximately four million households and tenure structure has changed when the share of renting households has decreased, which corresponds to the real state in the Czech Republic. The causes of structural changes were discussed in the first chapter.

Table 13 Tenure structure of Czech households

Tenure status (%)	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*	*2013*
Tenants	25.6	24.8	23.9	22.8	20.7	19.4	18.8	18.5
Owner-occupiers	74.4	75.2	76.1	77.2	79.3	80.6	81.2	81.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: own computation

Table 14 Probit model estimates of financial factors for Czech households

	2006	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*	*2013*
Pseudo-R square (Nagelkerke)	***0.048***	***0.078***	***0.075***	***0.112***	***0.124***	***0.212***	***0.218***	***0.182***
Link Function: Probit	***Probit Estimates***							
***Threshold* [typ_vlast= 0.00]**	1.536	1.234	1.212	1.580	1.860	2.131	1.266	1.337
Ability to make ends meet* (AMEM)	-0.082	-0.051	-0.114	-0.160	-0.151	-0.213	-0.190	-0.208
Financial burden of total housing costs* (FBTHC)	0.301	0.259	0.210	0.226	0.256	0.238	0.007	0.151
Arrears on utility bills (AUB)	-0.275	-0.581	-0.368	-0.472	-0.257	-0.183	-0.218	-0.213
Total housing costs (THC)	0.000	0.000**	0.000	-0.001	-0.002	-0.004	-0.004	-0.003
Disposable income (DI)	0.281	0.225	0.223	0.333	0.412	0.517	0.425	0.416
Capacity to afford a meal every second day* (CAM)	-0.028	0.066	0.036	0.075	0.076	0.160	0.130	0.034
Capacity to afford paying for one week holiday* (CAH)	-0.027	-0.049	-0.152	-0.185	-0.113	-0.165	-0.106	-0.051
Capacity to face unexpected financial expenses* (CFUFE)	0.337	0.399	0.405	0.480	0.385	0.369	0.377	0.355

**Subjective variable-respondent's feeling*
***Variable is not significant as predictor (p-value > 0. 05)*
Source: own computation

When we look at the results of the probit model we can observe that the single explanatory variables are changing gradually and smoothly. The variable **AMEM** shows increasing likelihood of issues concerning the ability to make ends meet for tenants as time goes by (β^{2013}= - 0.208). It can indicate the worsening financial situation of renting households. Nevertheless, according to the results presented in the following chapter we will see that the median for the lowest monthly income to make ends meet is the same for both tenure types in 2013. It means that in 2013, tenants and owner-occupiers needed the same amount of money to make ends meet on the average and we can consider the idea of a tenant's irresponsible behaviour. But when we take the results for the variable **FBTHC**, there is a higher likelihood for home-ownership (β^{2013}= 0.151). The feeling that housing costs are a financial burden for owner-occupied households may come from the perception of mortgage repayments as a financial burden when we realize how many households take out a mortgage and how great a proportion of household's budget it accounts for. But on the other hand, the significance of this variable is halved which corresponds to the decreasing average interest rates during the observed years.[43] The variable **AUB** expresses similar results as the variable **AMEM** with the increasing probability of being a tenant if the household faces arrears on utility bills (β^{2013}= - 0.213). The biggest significance of the probit estimates were during the years 2007-2009 (β^{2007}= - 0.581) which can be influenced by the financial crisis and deregulation process of rents which began in 2007. The variable **THC** has no impact on tenure type in itself (β^{2013}= - 0.003). Unlike variables as AMEM and FBTHC which express the subjective feelings of households, the variable THC is objective, which means that the variable is based on hard data and not only the subjective feelings of households regarding their situation. So we can conclude that the amount of total housing costs in itself do not play role in tenure choice and what is more important is the relation between housing costs and household income.

The variable **DI** as another objective variable is the most often used explanatory variable because of its strong ability to explain tenure choice with a relatively high probability estimates (β^{2013}= 0.416). The estimates have even increased with time. The direction of the variable shows that a higher disposable income also increases the likelihood of choosing homeownership. The variable **CAM** indicates only a weak impact on tenure choice (β^{2013}= 0.034). It may be influenced by the nature of this type of goods since a meal is

[43] MRD. *Selected Data on Housing: 2014*, 2015. (p. 158)

obviously perceived as a necessity, regardless of tenure type. The variable **CAH** produces interesting results. The results for this variable indicates higher probability of being tenant in spite of the fact that only tenants seem to be facing issues concerning the ability to make ends meet while struggling with arrears on utility bills, which can also point to a tenant's irresponsible behaviour. The significance of the variable CAH had the highest estimates during the years 2008-2011 (β^{2009}= - 0.185), but in the last observed year the likelihood decreased significantly. The variable **CFUFE** has the second highest significance after the disposable income (β^{2013}=0,355). During the years 2006-2009, the variable had been even more significant than the disposable income. CFUFE can indicate a household's responsible behaviour in managing its finance. Estimates showed increasing probability for owner-occupied households and so they appear to be more responsible compared to tenants.

2.3 Results for Finland

Results for Finland were also computed with data provided by EU-SILC databases. We observed the development of financial factors over time in the years 2006-2013 and the probit model has been set in the same way as in the Czech Republic which enables a comparison of these two countries. We can observe that tenure structure was stable during the observed years. The share of tenants here is higher than in the Czech Republic and the proportion more corresponds with the European Union average. The total number of the Finnish households representing financial information in the model corresponds to the real state in Finland as well.

Table 15 Tenure structure of Finnish households

Tenure status (%)	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*	*2013*
Tenants	31.9	32.2	32.6	31.6	30.8	31.2	31.3	31.9
Owner-occupiers	68.1	67.8	67.4	68.4	69.2	68.8	68.7	68.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: own computation

Table 16 Probit model estimates of financial factors for Finnish households

	2006	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*	*2013*
Pseudo-R square (Nagelkerke)	***0.410***	***0.383***	***0.377***	***0.371***	***0.414***	***0.420***	***0.416***	***0.431***
Link Function: Probit	***Probit Estimates***							
***Threshold* [typ_vlast= 0.00]**	5.803	6.466	6.420	7.081	6.726	7.171	6.785	7.243
Ability to make ends meet* (AMEM)	-0.219	-0.050	-0.210	-0.098	-0.120	-0.013	-0.167	-0.181
Financial burden of total housing costs* (FBTHC)	0.133	0.146	0.060	0.072	0.028	-0.007	0.026	0.020
Arrears on utility bills (AUB)	-0.033	0.336	0.000**	0.132	0.060	0.080	0.121	0.100
Total housing costs (THC)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
Disposable income (DI)	0.847	0.895	0.907	0.975	0.989	1.023	0.993	1.030
Capacity to afford a meal every second day* (CAM)	0.135	0.276	0.200	0.344	0.038	0.202	0.055	0.213
Capacity to afford paying for one week holiday* (CAH)	0.148	0.102	0.000**	-0.002**	-0.079	-0.056	-0.074	-0.020
Capacity to face unexpected financial expenses* (CFUFE)	0.625	0.652	0.668	0.690	0.769	0.715	0.737	0.691

**Subjective variable-respondent's feeling*
***Variable is not significant as predictor (p-value > 0. 05)*
Source: own computation

The probit model results for Finland do not change so smoothly as in the Czech Republic, but the directions of estimates are mostly the same. The variable **AMEM** shows the estimates with increasing probability for tenants (β^{2013}= - 0.181) which means that the perception of problems with making ends meet is higher for tenants, but not so high as in the case of Czech rental households. However, the fact is that according to the results in 2013 the lowest monthly income to make ends meet is even lower for tenants, which can again begs the question of whether the tenant's irresponsible behaviour is to blame or if it is influenced by lower incomes on average. The feeling of **financial burden of total housing costs (FBTHC)** is more likely for owner-occupiers (β^{2013}= 0.020), but the significance is quite low. It can indicate that the Finnish households do not perceive their housing costs as such significant financial burden relating to their tenure type.

The variable **AUB** is the only variable with a different direction (β^{2013}= 0.100) than in the Czech Republic, where tenants faced a higher likelihood of arrears on utility bills. It can indicate that the Finnish renting households have a more stable financial position thanks to a housing allowance system than the Czech renting households and this hypothesis will be tested in the following chapter more thoroughly. Total housing costs **(THC)** as an objective variable, as in the results for the Czech Republic, has no impact on tenure choice (β^{2013}= - 0.020). Results for the variable **DI** show expected estimations. Alongside a higher probit estimate is also the increasing likelihood of choosing homeownership (β^{2013}= 1.030) and the significance of these estimates has been increasing with time. But according to computation, the figures for Finland are significantly higher than those for the Czech households which can be influenced by a greater gap between the median disposable household incomes of owners and tenants in Finland. The variable **CAM** shows different results in Finland where there is a greater significance of estimates for owner-occupiers (β^{2013}= 0.213). According to *Comparative price levels for food, beverages and tobacco published by Eurostat*, meat, fish and other vegetarian equivalent are generally more expensive in Finland and since there is a greater gap between the median disposable household incomes in favour of owner-occupiers, this fact could influence higher estimates of the variable for owner-occupied households.[44] On the other hand, the variable **CAH** has only low significance (β^{2013}= - 0.020) and therefore the variable has almost no impact on tenure choice. As in the case of the Czech Republic, the variable **CFUFE**

[44] EUROSTAT. *Comparative price levels for food, beverages and tobacco*, 2013.

shows a significantly strong estimate towards the owner-occupiers (β^{2013}= 0.691) which stresses the ability of owners to set aside some amount of money for unexpected expenses and their ability to manage its household finance.

2.4 Discussion

The probit model shows which from the selected financial variables have the greatest significance and impact on tenure choice: Disposable income, Capacity to face unexpected financial expenses, Ability to make ends meet and Arrears on utility bills. Results for the variable **DI** show that with increasing income the likelihood of choosing homeownership also increases due to the purchase of own housing being a costly investment, and therefore it is essential for a household to earn a sufficiently high income in order to afford that investment. The variable **CFUFE** indicates a better financial position of owner-occupiers. It can be influenced by the greater ability of these households to manage their household budget or generally by a better financial position. This issue will be further analysed in the following chapter by the measuring of housing affordability. In the case of variable **AMEM** and **AUB** it has been proven that the renting households in the Czech Republic have a greater likelihood of financial difficulties and therefore their situation will also be analysed in detail in the following chapter. From the perspective of the responsible behaviour of each type of household, the variable **CAH** may indicate a specific behaviour of the Czech tenants who despite the greater likelihood of financial difficulties completed the questionnaires with an affirmative response about their ability to afford a holiday.

When we compare the Czech and Finnish households we can recognize that they differ in certain respects. While the results for the Czech tenants indicate problems with repayment of financial liabilities, among Finnish households it is not so clear. On the one hand, the variable **AMEM** shows a greater likelihood for the Finnish renting households, but on the other hand the variable **AUB** point to owner-occupiers. Therefore, it is necessary to further analyse the position of tenants on the housing market and their housing affordability, and to clarify their real position.

3 HOUSING AFFORDABILITY IN THE CZECH REPUBLIC AND FINLAND

This chapter builds on the previous chapter where the probit model indicated that the Czech rental households more inclined to financial problems and dissatisfaction associated with this type of housing. These results were also in compliance with the conclusion from the first chapter where it was implied that the deregulation process could have an unfavourable impact on a tenant's financial position and housing affordability. In order to prove this hypothesis, I have chosen as the main method of evaluating the financial situation of households the housing affordability method. The calculation is preceded by a theoretical sub-chapter summarizing the basic knowledge and methods used for assessing the housing affordability.

Following the theory I briefly describe basic statistics regarding the Czech and Finnish owner-occupied households (based on EU-SILC) and the results of selected indicators for testing an owner's housing affordability. Although the chapter should be focused especially on rental households, by testing of owner-occupied households I want to make sure that the potential financial constraints on the housing affordability does not affect them in such a large extent as in case of rental households.

In the sub-chapter dealing with the tenants I also describe the basic statistics for the Czech Republic and Finland (based on EU-SILC) and then I use two most commonly used indicators of housing affordability adjusted to provide as much of the information about the housing affordability of the Czech and Finnish households as is possible in comparable form.

Finally, I try to assess the overall housing affordability and compare both countries.

3.1 The Concept of Housing Affordability

Affordability as an indicator can be defined in different ways. The term "afford" could be defined as being able to pay without incurring financial difficulties.[45] The problem comes when we should decide when households or individuals are in financial difficulty because some things are considered unaffordable even if someone´s income is greater than the cost of a particular item. According to the affordability, we are talking about the amount of financial stress that we have to face by the purchasing of an item. To consider financial stress, we take into account how much of our income we spend on this purchase and how much income was left over for other goods. This way of thinking can be applied to housing just as easily as any other goods but we should not lose sight of the fact that housing has its own unique specifications. Housing accounts for a much greater proportion of a household´s monthly expenditure than most other groups of goods and services. And a particular house can be seen as quite affordable, while some other goods for the same price is perceived as highly unaffordable. A related concept used in this field of study is the concept of accessibility as a reflection of the initial conditions of potential tenants or owners. These conditions include income, rent, housing prices, and the interest rate and they may be further influenced by an exogenous entity, as for instance by a government and its housing policy.[46]

The concept of housing affordability can be viewed from different perspectives due to different tenure type. The literature usually works with these 3 groups: affordability for renters, affordability for would-be home owners and affordability for existing homeowners. To see the difference, we can imagine someone who is renting housing: he or she does not consider the actual value of the house as much as someone who wants to buy that house. Similarly, interest rates have only small impact on the decision-making of renters.[47]

[45] Collins English Dictionary
[46] ROBINSON, Mark, Grant M. SCOBIE a Brian HALLINAN. *Affordability of Housing: Concepts, Measurement and Evidence*, 2006. (p. 1-2).
[47] Op. Cit. (p. 3).

The literature defines several factors that contribute to the affordability of housing and they are clearly interrelated:[48]

-Income (current/expected lifetime; gross/net) has a direct impact on the ability to purchase housing and make housing payments

-House prices and rents as the level of payment for securing of housing

-Interest rates (nominal/real) which determine the costs of borrowing for home owners

-Labour market conditions contributing to the ability to earn an income which is necessary for the maintaining of housing costs over a period of time

-Mortgage and rent payments with their impacts on the household´s ability to save money and potentially increase housing consumption in the future

-Supply constraints which limit the ability of the market to respond to demand for housing

3.1.1 Applying Economic Concept of Affordability

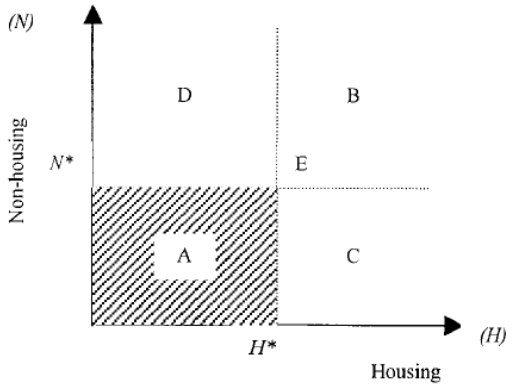
According to economic concept, affordability can be defined as follows: *''Affordability is concerned with securing some given standard of housing (or different standards) at a price or a rent which does not impose, in the eyes of some third party (usually government) an unreasonable burden on household incomes.''* [49]

In this concept, housing and non-housing are perceived as merit goods. With the income constraint given, there is any combination of housing and non-housing consumption, which is perceived by government and society as the socially acceptable minimum standard securing a pre-determined standard of housing.

In Figure 5 we can see the quantity of housing (H) on the x-axis and the quantity of non-housing (N) on the y-axis consumed by a household. The socially acceptable minimum standard of the combination of housing and non-housing consumption is represented by the society, government and other interest groups as H* and N*. Point E represents the above mentioned definition.

[48] ROBINSON, Mark, Grant M. SCOBIE a Brian HALLINAN. *Affordability of Housing: Concepts, Measurement and Evidence*, 2006. (p. 4-5)
[49] EDITORS DUNCAN MACLENNAN AND RUTH WILLIAMS. *Affordable housing in Britain and America*, 1990.

Figure 5 Minimal Definition of Affordability

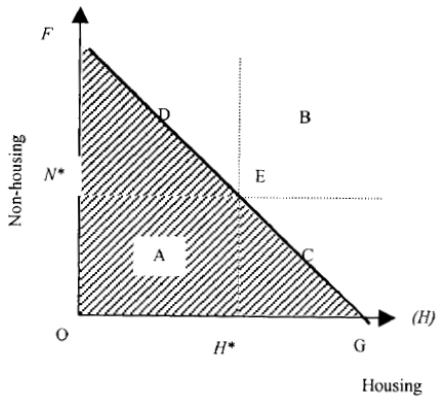


Source: Measuring Affordability in Public Housing from Economic Principles: Case Study of Hong Kong By Eddie C. M. Hui

In region B, the household is regarded as affordable because they are consuming more than the minimum standards of both goods. In regions C and D, the household is consuming the minimum standards of only one of the goods. In region A other than point E, where consumption of both goods is insufficient (below the minimum standards), the household is regarded as unaffordable.

Taking the income constraint of the household into consideration, we depict line FG as the income in relation to the prices of housing and non-housing goods (see Figure 6). The line shows the opportunity costs of forgoing one unit of non-housing (N) by one unit of housing (H). Adding the income constraint, the affordability becomes more stringent.

Figure 6 Affordability of Household with Income Constraint

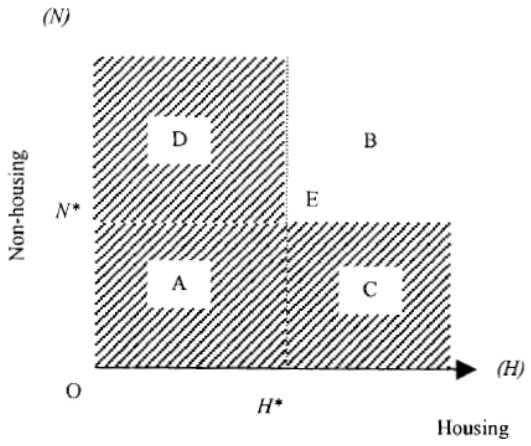


Source: Measuring Affordability in Public Housing from Economic Principles: Case Study of Hong Kong By Eddie C. M. Hui

In this Figure, the household is regarded as affordable only if they are consuming any combination of both goods posited on the line FG. In the shaded area, the household is also regarded as affordable but with under-consuming of both goods. In the triangles N*FE and H*EG, only one of the goods is consumed sufficiently.

In contrast to minimal definition of affordability, we can perceive the household as affordable only if their consumption pattern falls into region B with the most stringent definition of affordability. It means that both levels of housing and non-housing consumption patterns at least equal the socially acceptable minimum standards and under-consumption of any one good denotes that the household is regarded as unaffordable.[50]

Figure 7 Most Stringent Definition of Affordability



Source: Measuring Affordability in Public Housing from Economic Principles: Case Study of Hong Kong By Eddie C. M. Hui

3.1.2 Affordability measures

There are two different groups of affordability measures: "shelter first" and "non-shelter first" measures. The shelter first approach relies on the fact that housing has the first claim on the household budget and following that other expenditures are met from the remainder of the budget. This concept is the most common. The non-shelter first approach conversely relies on the fact that other expenditures have the first claim on the household budget and housing costs are met from the remainder of the budget. From the shelter first point of view, there are two main types of measurement: Rent-to-income ratio and Residual income measure.

[50] HUI, Eddie C. M. *Measuring Affordability in Public Housing from Economic Principles: Case Study of Hong Kong*, 2001. (p. 39-42)

The non-shelter first approach is rarely used and requires an estimate of the costs of all non-housing spending. There is a possibility to measure affordability only by the residual income approach.[51]

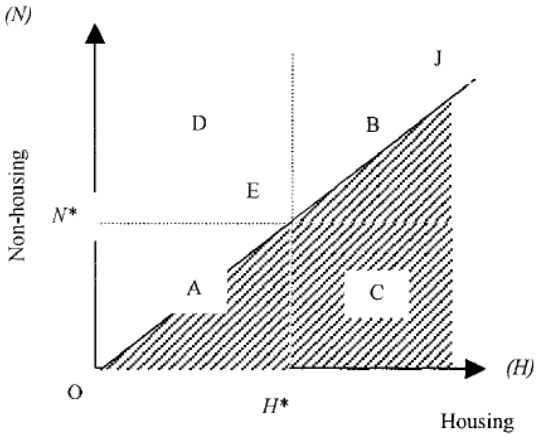
Rent-to-Income Ratio

Rent-to-income ratio can be applied in the case of affordability for renters where the rent is divided by income. Then is presented the proportion of households with the ratio above a pre-determined level. The most common benchmarks are a rent-to-income ratio level of 25 % or 30 %. It also must be considered what is meant by "rent" and "income". Income can be gross and net, taking in to consideration all income or only wage/salary, individual or household income, and income without or with thought of housing benefit or subsidy. The issue could be also whether to use current or permanent (expected lifetime) income. The estimation of lifetime income can be difficult, but on the other hand when people make housing choices they consider their expected future income. Rent or more generally outgoings can be even more variable. We can choose whether to include only rent and mortgage payments in case of owners or also other costs like repairs and rates.[52]

According to Engel´s definition of affordability, we can take the relative price of housing and non-housing goods and the ratio would be best represented by line OJ depicted in Figure 8.[53] Housing is said to be affordable if a household´s consumption pattern lies on or above OJ line, signifying region D and parts of regions A and B. On the other hand, housing is said to be unaffordable if a household´s consumption pattern lies under OJ line in shaded area, signifying region C and parts of regions A and B.[54]

[51] ROBINSON, Mark, Grant M. SCOBIE a Brian HALLINAN. *Affordability of Housing: Concepts, Measurement and Evidence*, 2006. (p. 5).
[52] Op. Cit. (p. 5).
[53] DENG, Lan. *The Affordable Housing Reader*, 2015. (p. 81).
[54] HUI, Eddie C. M. *Measuring Affordability in Public Housing from Economic Principles: Case Study of Hong Kong*, 2001. (p. 36-38)

Figure 8 Rent-to-Income Ratio Approach



Source: Measuring Affordability in Public Housing from Economic Principles: Case Study of Hong Kong By Eddie C. M. Hui

In spite of the widespread usage of this concept, the ratio seems to have conceptual and theoretical problems. The ratio approach violates the basis of economics because it omits the income constraint of the household and in that case income constraint is not relevant in formulating domestic housing policy. Another problem occurs when the household is consuming insufficient housing and non-housing goods (below socially acceptable minimum standards) at a point falling into region A. Therefore, these households may be excluded from any housing benefit or subsidy. On the other hand, the overconsumption of some high-income households may make housing benefit or subsidy accessible if they choose a consumption pattern falling into the shaded area.

The Uses of Housing Expenditure-to-Income Ratio

According to Hulchanski (1995), there are defined 6 uses of housing expenditure-to-income ratio (different term for the rent-to-income ratio) with the aim of revealing in what way the ratio is being used, what the ratio is supposed to be measuring and if it does it in a valid and reliable manner.

1) Description of Household Expenditure

Distinction between different household types (owners with/without mortgage and renters) enable us to see that there are different ratios for different household types.

2) Analysis of Trends

Observation of certain societal trends and dynamics enable us to identify relationships between financial situations and housing affordability and consequently draw conclusions.

3) Administration of Public Sector Housing Subsidies

The regulations based on expenditure-to-income ratio are used in many countries with respect to the setting of administrative regulations assessing eligibility and determining rent levels for subsidised housing with the aim of keeping out high-income households and target subsidy on pre-determined household types.

4) Definition of Housing Need

According to the fact that the expenditure-to-income ratio fails to account for the diversity in household types, different stages in the life cycle or diversity in household consumption patterns, a definition of housing needs cannot be defined only by this ratio.

5) Prediction of Household´s Ability to Pay the Rent or Mortgage

There is a theoretical and empirical evidence that households meet their needs through a variety of methods (the domestic economy, the informal economy, the social economy, the market economy and the state economy) more likely than only through minimum money income criteria which is used in predictions of a household´s ability to pay. The reality of how households manage their consumption patterns is too complex to be summarised in only one simple expenditure-to-income ratio measure.

6) Selection Criteria

The public sector uses a variety of discriminatory criteria as eligibility criteria with the aim of separating households into eligible and non-eligible groups and better target the subsidy. Income criteria represented by expenditure-to-income measure is one of them. But do we have the evidence that this ratio can decrease the risk of default? As Lane (1977) pointed out, there are many other reasons why people, no matter what is their income level, may default on their rent or mortgage payment.[55]

[55] LANE, T.S. *What Families Spend dor Housing- the Origins and Uses of the „Rule of Thumb“,* 1977.

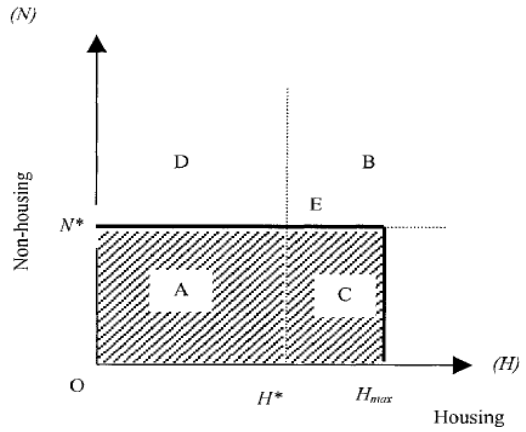
The expenditure-to-income ratio can be useful as an indicator in housing research, but with respect to the nature of the research and used methods. However, this ratio can be misleading in identifying housing needs or the ability to pay due to a great variety of household types and their different situations in the life cycle stages and consumption patterns point of view. Therefore, policy makers and researches should be careful when they are using the term "housing affordability" based on expenditure-to-income ratio measure.[56]

Residual Income

Residual income is represented by person´s or household´s income minus their housing costs. Then we can also find the proportion of households below some pre-determined level and higher proportion indicates relative unaffordability. Again, there are more options to consider what we mean by "income" and "housing costs" and what measurement we decide to use. According to both Grigsby and Rosenburg (1975) and Bramley (1990), they aimed at ensuring a minimum level of non-housing consumption pattern, depicted as N* in Figure 9. Their concept determines a socially acceptable minimum standard of non-housing consumption arbitrarily in an absolute rather than relative sense.[57] Housing benefit or subsidy is necessary for low-income households to reach the socially acceptable minimum standard with the opportunity of increasing their non-housing consumption. However, this housing policy has its shortcomings despite their attempt to help households with reaching optimal housing and non-housing consumption. In the case of housing benefit, unaffordable households are eligible for rent reduction and this benefit would discourage them from negotiation with property owners for lower rent in the private market or reduction of their housing consumption to the adequate level. On the other hand, in the case of housing subsidy, unaffordable households are eligible for income supplements, which means that both housing and non-housing consumption can be increased. But thanks to different household´s indifferent curves representing their tastes and preferences, subsidy does not guarantee that households choose a socially acceptable minimum standard of housing consumption.[58]

[56] HULCHANSKI, David J. *The concept of housing affordability: Six contemporary uses of the housing expenditureto-income,* 1995.
[57] GRIGSBY, William G a Louis Stanley ROSENBURG. *Urban housing policy*, 1975.
BRAMLEY, G. *Access, Affordability and Housing Need*, 1990.
[58] HUI, Eddie C. M. *Measuring Affordability in Public Housing from Economic Principles: Case Study of Hong Kong*, 2001. (p. 38-39)

Figure 9 Residual Income Approach



Source: Measuring Affordability in Public Housing from Economic Principles: Case Study of Hong Kong By Eddie C. M. Hui

Affordability Measures for Home owners

From the home owner's point of view, we have to consider different conditions in measuring housing affordability. Instead of a rent-to-income ratio for existing home owners, we use the ratio of mortgage payments to income and for would-be owners, the potential mortgage payments, current interest rates and house price are the relevant outgoings. The residual income measures income minus the above mortgage payments for both existing and would-be owners. Differences appear also with different lengths of ownership because would-be owners usually face higher interest rates and a smaller deposit, and on the contrary long term home owners have lower monthly repayments or have even fully paid off their mortgage.[59]

3.1.3 Advantages and Disadvantages of Selected Measures

Rent-to-income ratios are very easy to understand and calculate. The data necessary for calculation are also easily available in varied national or international statistical databases. However, since it is only a ratio, this measurement does not represent the financial situation of a household after housing payments. This measurement only shows the proportion of households above a pre-determined level. For instance, when we take a low-income household which spend "only" 20 % of its household budget on housing, according to our ratio this household would be regarded as affordable, but in reality the remaining household budget could be so low that the household will face problems

[59] ROBINSON, Mark, Grant M. SCOBIE a Brian HALLINAN. *Affordability of Housing: Concepts, Measurement and Evidence,* 2006. (p. 6)

with affordability of other non-housing goods. On the other hand, we can take a high-income household which spend more than 40 % on housing (usually regarded as housing costs over-burden rate), which means that according to our ratio this household would be regarded as unaffordable, but in reality the remaining household budget could be still high enough to afford a lot of other non-housing goods. This problem can be overcome by looking only at low-income households where housing costs play crucial role.

Another problem with this approach is the absence of information about the quality of the housing. In that case, the low housing costs could be linked to low standards of the housing, but according to our ratio a particular household may seem satisfactory.

The major disadvantage of the rent-to-income ratio is that the ratio only considers the affordability at the present moment and there is no consideration of future changes to rents, income, and all other factors that could have an impact on the housing affordability.[60]

The residual income measure is designed to overcome a major problem of rent-to-income measurements - the ability to cover non-housing costs after housing payments. They both have the same advantage, the measurement is simply to calculate with easily available data (the same data as the corresponding rent-to-income ratio). However, this measurement does not take into account the quality of the housing and also future changes in conditions affecting the housing affordability.

The affordability can differ also due to differing accessibility in different regions, different preferences or due to their life cycle position.[61]

Nevertheless, the above mentioned disadvantages does not mean that these measurements should not be used. Both of the measures outlined are useful to some degree and if a complete picture of the housing affordability situation is to be achieved, especially when observing affordability for specific individuals, more than one measure must be considered.

[60] ROBINSON, Mark, Grant M. SCOBIE a Brian HALLINAN. *Affordability of Housing: Concepts, Measurement and Evidence*, 2006. (p. 7-8)
[61] Op. Cit. (p. 8).

3.2 Owner-occupied households

The first step in the determination of housing affordability for owner-occupier households is defining the tenure status of owner occupiers. According to the EU-SILC description of target variables, owner-occupiers are defined outright owners and owners paying mortgage. The owner is considered as the "outright owner" when there is no mortgage paid for the purchase of the main dwelling. The owner is considered as "mortgage-paying owner" when there is a mortgage paid for buying the main dwelling. The owner who pays mortgage only for the second dwelling and/or for repairs, renovation, maintenance etc. is considered as the "outright owner". A household living in a cooperative apartment is also considered as an owner-occupier.

3.2.1 Description of Czech owner-occupiers

In the computations I worked with the information of over 3 million of Czech owner-occupied households from which approximately 18. 5 % are repaying their mortgage.[62] The following figures (see Table 17) represent the basic descriptive statistics results for owner-occupiers for 2013.[63]

Table 17 Basic descriptive statistics of the Czech owner-occupied households (the prices denoted in EUR)

	N	*Minimum*	*Maximum*	*Mean*
Disposable household income (yearly)	3 335 828	-4.61	115 108.12	14 826.61
Total housing costs (monthly)	3 335 828	13.60	2 205.85	246.06
Mortgage principal repayment (monthly)	602 761	9.42	1 075.30	142.38
Lowest monthly income to make ends meet	3 335 828	176.71	3 976.26	925.29
Housing allowances (yearly)	52 176	49.62	2 385.78	919.17

Source: own computation

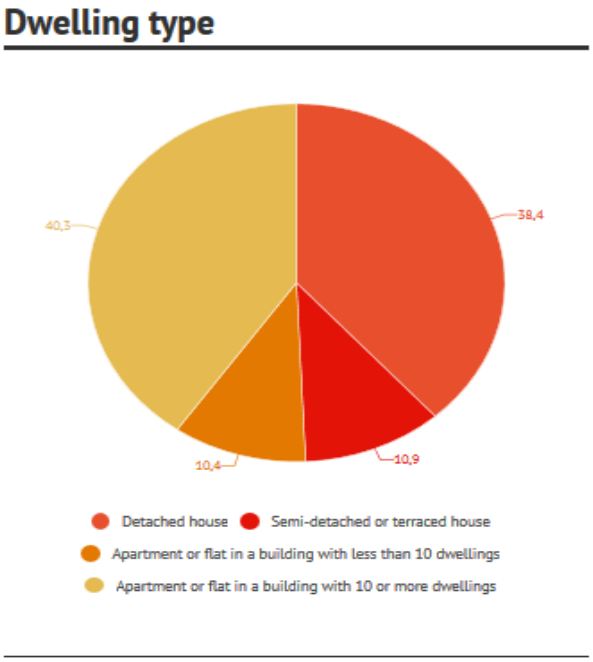
According to descriptive statistics based on EU-SILC datasets, a prevalent part of owner-occupiers live either in detached houses (38. 4 %) or apartments and flats in a building with 10 or more dwellings (40. 3 %).

[62] In order to convert the sample of households to the entire Czech Republic the coefficient „pkoef" is used as the weighting of each surveyed household

[63] the latest available version of EU-SILC database for the purpose of this master's thesis.

Although living in a family house (detached house) is the more preferred option, as the survey provided by Institute of Sociology of the Czech Academy of Sciences shows[64], living in apartment or flat in a building with more dwellings is still the more affordable option with a lower price of flats compared to the price of family houses[65].

Figure 10 Structure of dwelling type of the Czech owner-occupied households

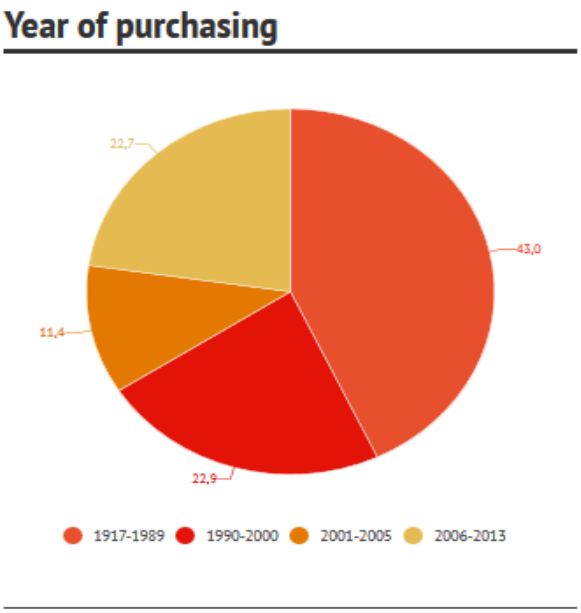


Source: Own computation

Year of purchasing statistics shows that 43 % of owner-occupiers purchased their own housing before 1989. It can be influenced by a relatively small inner-migration rate of the Czech Republic, especially in the case of owner-occupiers. As the studies show, the tenure status of a household is a statistically significant reason for low inner-migration rate in the Czech Republic since homeownership relates to higher satisfaction with housing and therefore households do not intend to migrate.[66]

[64] LUX, Martin. *On housing satisfaction among Czech citizens*, 2005.
[65] MRD *Selected Data on Housing: 2014*, 2015. (p. 127-130)
[66] LUX, Martin. *The Effect of Housing Conditions on the Intended Labour Migration of the Czech Population*, 2007.

Figure 11 Year of purchasing of the Czech owner-occupied households



Source: Own computation

3.2.2 Description of Finnish owner-occupiers

Results for Finland were computed on the basis of information of more than 1. 7 million of Finnish owner-occupied households from which almost 50 % are repaying their mortgage (higher percentage than in the Czech Republic).[67]

Table 18 Basic descriptive statistics of the Finnish owner-occupied households (the prices denoted in EUR)

	N	*Minimum*	*Maximum*	*Mean*
Disposable household income (yearly)	1 745 541	-638.00	1 820 436.00	43 435.34
Total housing costs (monthly)	1 745 541	13.00	3 333.00	432.71
Mortgage principal repayment (monthly)	809 483	1.08	11 067.00	522.87
Lowest monthly income to make ends meet	1 594 161	25.00	30 000.00	1 790.34
Housing allowances (yearly)	85 995	-2 461.00	5 604.00	960.10

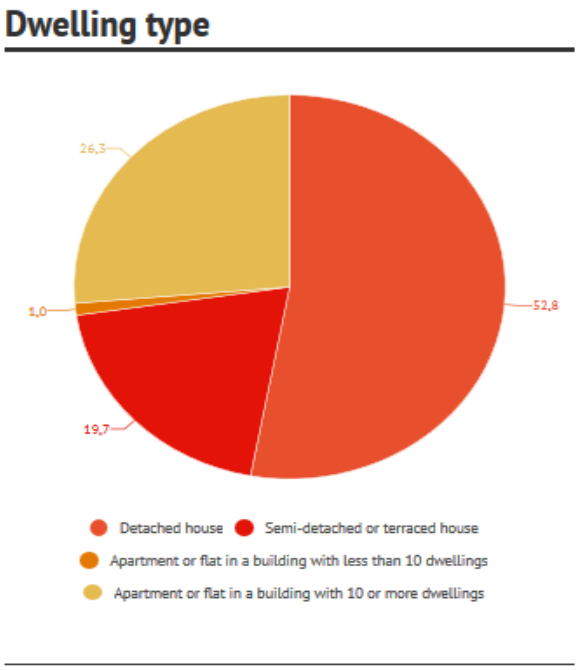
Source: own computation

From Figure 12 is possible to see that the prevalent part of Finnish owner-occupied households are living either in detached, semi-detached or terraced houses (72. 5 %).

[67] In order to convert the sample of households to the entire Finland the coefficient „pkoef“ is used as the weighting of each surveyed household

Housing in apartments or flats is a less represented dwelling type than in the Czech Republic (27. 3 %). Regarding the housing prices, living in a family house is a cheaper option than living in apartments or flats, which is the opposite situation to that in the Czech Republic.[68]

Figure 12 Structure of dwelling type of the Finnish owner-occupied households



Source: own computation

3.2.3 Financial responsibility of owner-occupied households

In order to see how strong the association between household income and housing costs is, the households were divided into quintile groups according their income and housing costs (see Tables 19 and 20). There was an expectation that a higher quintile groups is connected to increasing housing costs. The aim of this testing was to prove the financial responsibility of owner-occupiers. The measurement of financial responsibility of households is a necessary assumption for a housing affordability analysis. It means that a household does not spend more money on housing costs than it can afford according to the disposable income. The null hypothesis that variable household income and housing costs are independent was tested through Chi-squared test and Cramer's V.

[68] OSF. *Prices of dwellings in housing companies*

Table 19 The proportion of the Czech owner-occupied households by disposable income and total housing costs

Income/Housing costs (%)	*Bottom quintile*	*Second quintile*	*Middle quintile*	*Fourth quintile*	*Top quintile*
Bottom quintile	44.7	24.9	14.2	7.8	3.7
Second quintile	27.5	26.8	2.1	20.9	10.2
Middle quintile	14.9	21.1	24.3	21.8	19.7
Fourth quintile	8.6	14.5	21.9	25.6	28.0
Top quintile	4.3	12.7	17.5	23.9	38.4

Source: Own computation

Table 20 The proportion of the Finnish owner-occupied households by disposable income and total housing costs

Income/Housing costs (%)	*Bottom quintile*	*Second quintile*	*Middle quintile*	*Fourth quintile*	*Top quintile*
Bottom quintile	49.7	30.8	14.0	7.9	6.5
Second quintile	25.6	27.2	20.0	14.6	8.4
Middle quintile	15.3	21.1	25.7	20.8	17.2
Fourth quintile	5.4	12.7	22.9	27.8	27.5
Top quintile	4.1	8.2	17.5	18.9	40.4

Source: Own computation

The results show (see Appendix) that the sample size requirement for the chi-squared test of independence is satisfied. The null hypothesis is rejected and there is statistically significant association between income and housing costs with a p-value < 0.05. The strength of association is moderate for both Czech (Cramer's $V = 0.235$) and Finnish (Cramer's $V = 0.260$) owner-occupied households.

3.2.4 Housing Affordability of owner-occupied households

In order to ascertain housing affordability for owner-occupiers, the **house price-to-income ratio (HPTI ratio)** has been chosen here. On the basis of a different nature of particular tenure types the measurement which is the most suitable for owners has been chosen. The HPTI ratio shows how many annual disposable incomes the household needs to purchase their current house. A higher ratio expresses lower affordability. The meaning of crucial variables necessary for computation of the ratio are presented in Appendix. This ratio is used in two different ways, as "net" and "gross" ratios with respect to income adjusted to housing allowance. The "net" HPTI ratio is computed with disposable household income increased

by housing allowance and a “gross” HPTI ratio is decreased by housing allowance. The reason for distinguishing between “net” and “gross” ratios is to show the impact of housing allowance on housing affordability. To see the development of housing affordability I observed the HPTI ratio from 2008 to 2013.

According to our house price-to-income ratio, households were categorised into six groups. The first category (0-3) was inspired by housing affordability rating categories as absolutely affordable housing and other categories were proportionally adjusted. [69]

Figure 13 shows that the HPTI ratio development was stable during the years 2008-2013 regardless of the increasing share of owner-occupiers on the Czech housing market. Housing affordability seems to be invariable. Indices of the sale price of family houses show that the prices have increased slightly according to the wear rate by 2. 8 % since 2010.[70] On the other hand, indices of sale price of dwellings show that the prices have decreased slightly according to wear rate by 2. 0 % and the overall effect of the price change has been slightly increasing.[71] Disposable household income of owner-occupiers has increased by approximately 5 % since 2010.[72] Therefore, a similar and proportional trend on both sides contributes to stable housing affordability for owner-occupiers.

According to structured results we see that the biggest share (36 %) accounted for households who needed the equivalent of 3 to 6 of annual incomes to purchase their current house and 20 % of the households needed only from 0 to 3 of their annual incomes. The households who needed more than 10 annual incomes to purchase their current house accounted for approximately 20 % of all owner-occupiers.

[69] DEMOGRAPHIA. *Housing Affordability Rating Categories*
[70] MRD. *Selected Data on Housing: 2014*, 2015. (p. 129)
[71] Op. Cit. (p. 132).
[72] Own computation based on EU-SILC databases

Figure 13 House price-to-income ratio for the Czech owner-occupied households[73]

Source: own computation

This measurement and stable situation for owner-occupied households confirms that there is no significant reason to concentrate on the housing affordability of owner-occupied households.

When the results for "net" and "gross" HPTI ratios are compared, depending on whether or not the housing allowance was used, there is almost no difference between these two measurements. It could be influenced by a lower number of households entitled to housing allowances compared to rental housing and also overall housing costs are slightly lower for owner-occupied households. Finally, it can be concluded that the system of housing allowances does not play a significant role in housing affordability of owner-occupiers.

Unfortunately, housing affordability for owner-occupiers cannot be computed in the same way because of a missing crucial variable – the housing price for Finnish households in EU-SILC databases. But according to OECD research, the house price-to-income ratio for Finland has been maintaining the long-term average which matches the trend in the Czech Republic.[74]

[73] Overlapping categories <15-20) and <20 and more)
[74] OECD. *Focus on house prices*

3.3 Tenants

According to the EU-SILC description of a target variable, tenants are recognized as a tenants or subtenants paying rent at the prevailing or market rate or tenants living in accommodation rented at a reduced rate (lower price than the market price). In the case of rent at the prevailing and market rate, tenants pay the rent which is wholly recovered from private sources, housing benefits or other sources, including public or charitable. Reduced-rate renters include those renting social housing, renting at a reduced rate from an employer and those in accommodation where the actual rent is fixed by law.

3.3.1 Description of Czech renting households

Computations were made on the basis of information of almost 800 thousand of Czech renting households.[75] As in the case of owner-occupied households, datasets from 2013 were used for the computation of descriptive statistics about renting households. Compared to owner-occupied households, tenants have a lower mean and median disposable household income and higher housing costs which concludes in higher housing allowance paid by the government (see Table 21).

Table 21 Basic descriptive statistics of the Czech renting households (the prices denoted in EUR)

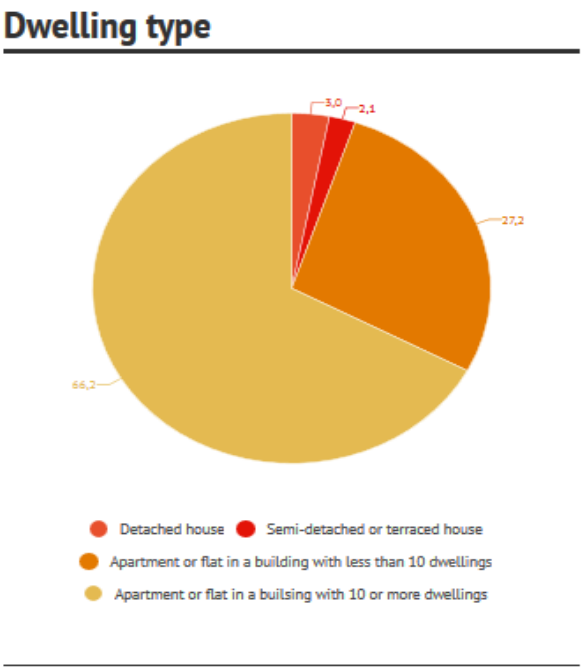
	N	*Minimum*	*Maximum*	*Mean*
Disposable household income (yearly)	775 862	-1 186.61	88 917.57	12 144.99
Total housing costs (monthly)	775 862	37.30	3 247.33	330.09
Current rent related to occupied dwelling (monthly)	775 169	3.38	2 982.23	268.45
Lowest monthly income to make ends meet	775 862	238.58	3 976.26	880.95
Housing allowances (yearly)	83 128	71.57	4 055.83	1 329.14

Source: own computation

Descriptive statistics based on EU-SILC datasets show that the prevalent part of tenants in the Czech Republic are living in apartments or flats in a building with 10 or more dwellings (66. 2 %), which is generally the most common form of rental housing (see Figure 14).

[75] In order to convert the sample of households to the entire Czech Republic the coefficient „pkoef“ is used as the weighting of each surveyed household

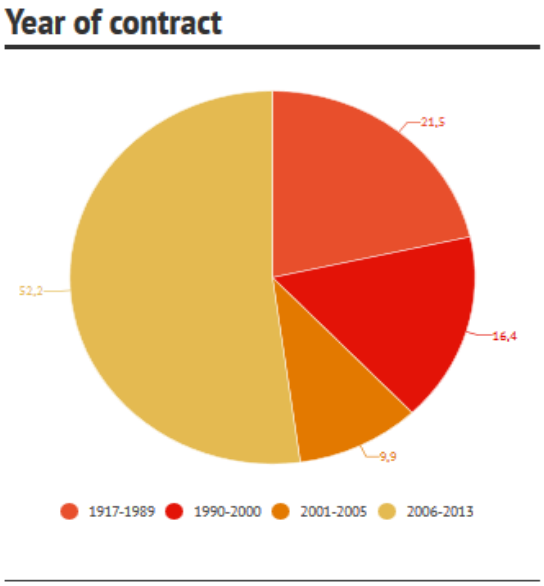
Figure 14 Structure of dwelling type of the Czech renting households



Source: own computation

The variable Year of tenant's contract demonstrates that approximately half of the Czech tenants have concluded their contract in the last 7 years of the period under consideration. This is compared to owner-occupier where I used the variable Year of purchasing and we can see the opposite situation (see Figure 15). The prevalent part of owners has stayed in houses or flats which were purchased before 1989. The reason for the different results of tenants and owners lies in the different inner-migration rate which is much higher for tenants who are not mortgaged and so it is much easier for them to change their housing.

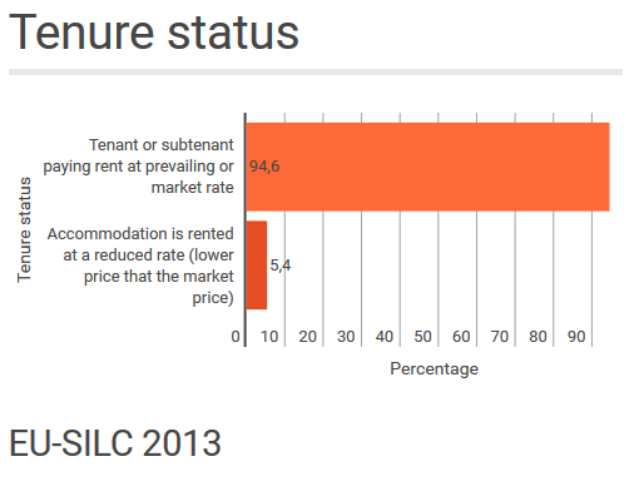
Figure 15 Year of contract of the Czech renting households



Source: own computation

The tenure status of renting households recognizes two types of tenants, those paying rent at the prevailing or market rate and tenants with rent at a reduced rate. As we can see from Figure 16, tenants with rent at the prevailing and market rate account for the majority of tenants (94. 6 %). It has been influenced by the recent deregulation process and the overall small role of social housing in the Czech Republic.

Figure 16 Tenure status of the Czech renting households



Source: own computation

3.3.2 Description of Finnish renting households

Computations for Finland were made on the basis of information of more than 800 thousand Finnish renting households provided by EU-SILC. Descriptive statistics show results for 2013, as in the case of Czech households. Compared to the Finnish owner-occupied households, tenants in Finland have a lower disposable household income and their total housing costs are higher.[76] On the other hand, they receive much higher housing allowances compensating for the burden of higher housing costs (see Table 22).

Table 22 Basic descriptive statistics of the Finnish renting households (the prices denoted in EUR)

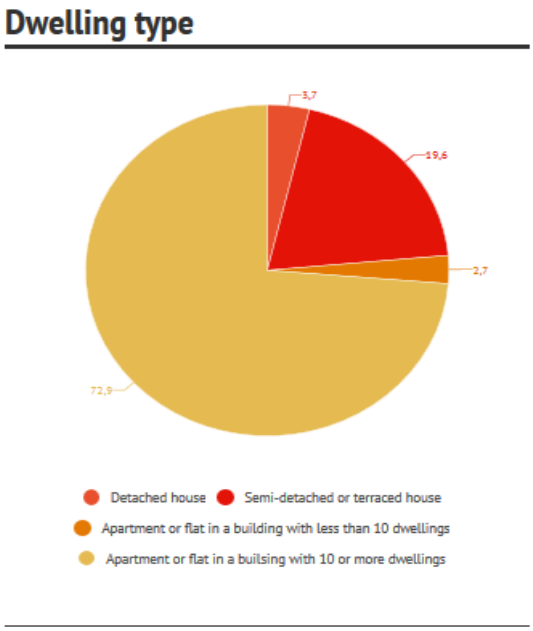
	N	*Minimum*	*Maximum*	*Mean*
Disposable household income (yearly)	828 709	-3 669.00	211 059.00	25 056.54
Total housing costs (monthly)	828 709	30.00	3 925.00	610.25
Current rent related to occupied dwelling (monthly)	828 709	30.00	3 550.00	555.62
Lowest monthly income to make ends meet	763 881	40.00	15 000.00	1 397.67
Housing allowances (yearly)	472 890	-1 840.00	11 369.00	2 251.11

Source: own computation

As in the Czech Republic, a prevalent number of Finnish tenants are living in apartments or flats in a building with 10 or more dwellings (72. 9 %). But in Finland there are a higher share of households living in semi-detached or terraced houses (19. 6 %), which is not so typical in the Czech Republic.

[76] In order to convert the sample of households to the entire Finland the coefficient „pkoef“ is used as the weighting of each surveyed household

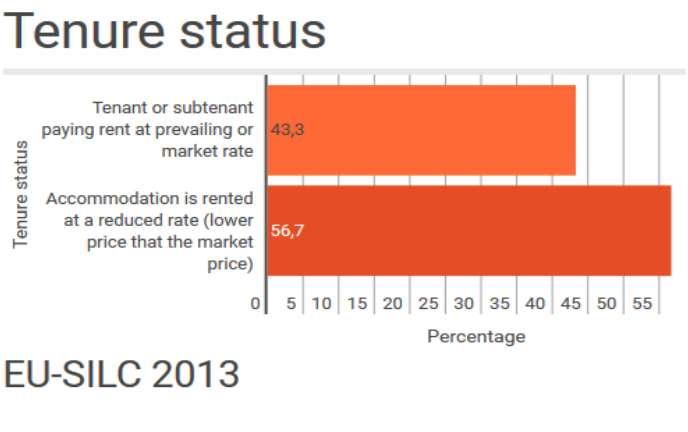
Figure 17 Structure of dwelling type of the Finnish renting households



Source: own computation

One of the biggest differences between the Czech Republic and Finland in the rental market is the share of households living in accommodation with rent at a reduced rate. While in the Czech Republic renting at a reduced rent is negligible, in Finland this type of housing accounts for more than half of the rental market (see Figure 18). The reason for the different proportions is greater development of social housing in Finland.

Figure 18 Tenure status of the Finnish renting households



Source: own computation

3.3.3 Financial responsibility of renting households

As in the case of owner-occupied households, renting households were divided into quintile groups according to their disposable income and housing costs to find out whether a household does not spend more money on housing costs than they can afford according to their disposable income (see Table 23 and 24). The measurement of financial responsibility is an important consideration because it can the influence household's housing affordability to a large extent. The null hypothesis tests whether variables household income and housing costs are independent through the Chi-squared test and Cramer's V. If our assumption is right, we will reject the null hypothesis.

Table 23 The proportion of the Czech renting households by disposable income and total housing costs

Income/Housing costs (%)	*Bottom quintile*	*Second quintile*	*Middle quintile*	*Fourth quintile*	*Top quintile*
Bottom quintile	51.1	19.2	12.1	8.0	5.5
Second quintile	23.6	28.0	21.8	19.4	11.4
Middle quintile	10.5	20.6	24.6	31.7	13.1
Fourth quintile	7.5	20.0	20.9	21.7	26.6
Top quintile	4.4	12.3	20.6	19.3	43.5

Source: own computation

Table 24 The proportion of the Finnish renting households by disposable income and total housing costs

Income/Housing costs (%)	*Bottom quintile*	*Second quintile*	*Middle quintile*	*Fourth quintile*	*Top quintile*
Bottom quintile	53.9	28.0	14.1	3.7	2.7
Second quintile	22.4	29.5	29.1	21.1	3.8
Middle quintile	13.3	24.0	27.4	23.9	10.6
Fourth quintile	7.3	13.4	22.1	29.5	24.3
Top quintile	3.0	5.2	7.3	21.8	58.5

Source: own computation

The results show (see Appendix) that the sample size requirement for the chi-squared test of independence is satisfied. The null hypothesis is rejected and there is a statistically significant association between income and housing costs with p-value < 0.05. The strength of association is moderate for both Czech (Cramer's $V = 0.247$) and Finnish (Cramer's $V = 0.344$) renting households.

3.3.4 Housing Affordability of renting households

In order to measure the housing affordability of Czech and Finnish renting households I chose "shelter first" approach as the most common approach. The "shelter first" approach relies on the idea that housing demands the first claim on the household budget and following that other expenditures are met from the remainder of the budget. From the possible "shelter first" approach measurements I focused on housing expenditure-to-income ratios, suitable for rental tenure type. I chose two particular ratios: **Housing costs-to-income ratio (HCTI ratio) and Rent-to-income ratio (RTI ratio)**. The variables necessary for computations are described in the Appendix. Both ratios were computed in two different ways, as "net" and "gross" ratio with respect to income adjusted to housing allowance. The "net" ratio is computed with disposable household income where the income is increased by housing allowance. The "gross" ratio is also computed with disposable household income where the income is decreased by housing allowance. The reason for distinguishing between "net" and "gross" ratio is to show the impact of housing allowance on housing affordability. According to the ratios I have identified the percentage of the population living in a household where the total housing costs (current rent related to occupied dwelling) represent more than pre-determined levels of the total disposable household income (net or gross of housing allowances) presented by rental accommodation tenure status. As a pre-determined level I chose 4 levels: 25 %, 30 %, 35 % and 40 % (the ratios hereinafter referred to as HCTI 25/30/35/40 or RTI 25/30/35/40). Level 25 % is one of the lowest levels defined in the literature.[77] Levels 30 and 35 % are derived from the design of computation for housing allowance in the Czech Republic. Level 40 % is defined by the EU as housing costs overburden rate.[78] Through the ratios I also observed variations in time (between years 2006 and 2013) which is an important observation considering the changing conditions on the Czech housing market. All these measurements were applied in the cases of both countries.

[77] ROBINSON, Mark, Grant M. SCOBIE a Brian HALLINAN. *Affordability of Housing: Concepts, Measurement and Evidence*, 2006.
[78] EUROSTAT. *Glossary: Housing cost overburden rate*

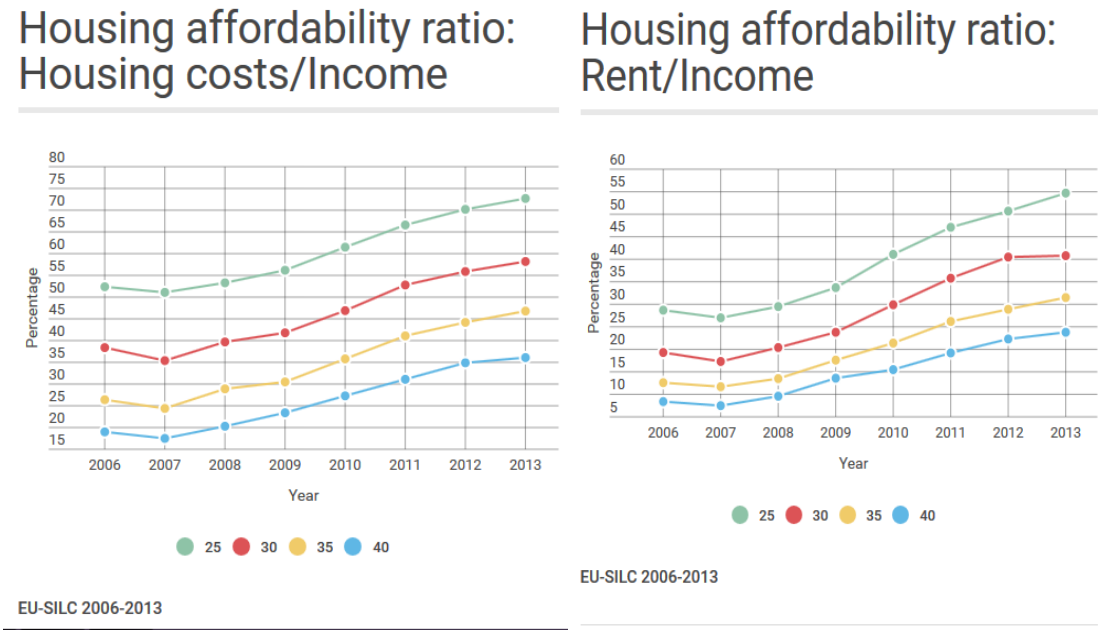
Results for the Czech Republic

The results show that the proportion of households with the HCTI and RTI ratios higher than pre-determined levels increased considerably (see Figure 19). It means that overall housing affordability on the rental market in the Czech Republic has decreased. In 2006 the proportion of households with "net" HCTI 25 accounted for 52. 4 % of rental households. In 2013 the proportion has increased to 72. 8 %. In case of HCTI 40 it was 19 % of rental households in 2006 and over time the proportion has increased to 36. 1 % of rental households. Compared to the EU 28 average where 25. 9 % of tenants spent on rent at market price more than 40 % of their household income in 2013, it is a much worse position in the Czech Republic according to housing affordability of renting households.

When we look at the RTI ratio where it is computed only with the current rent related to occupied dwelling without other payments as electricity, heating, repairs etc., the ratios are also increasing with similar proportionality with time. For instance, RTI 40 has increased from 8. 4 % in 2006 to 23. 8 % of rental households in 2013. Which means that according to the RTI ratio, housing affordability of renting households was deteriorating as well.

By comparing "net" and "gross" ratios, which means the comparing of ratios with and without taking into account housing allowance I discovered that there is only a small difference between these two measurements, and the percentage of the population living in a household where the total housing costs represent more than pre-determined levels of the total disposable household income (gross of housing allowances) is only slightly higher. In the case of the HCTI ratio it was a difference of 2. 2 % (for HCTI 25) to 5. 2 % of rental households (for HCTI 40) in 2013. For the RTI ratio it was a difference of 3. 9 % to 5. 5 % of rental households in 2013. We may conclude that housing allowances in the Czech Republic have only a small impact on the housing affordability of renting households.

Figure 19 HCTI and RTI ratios for the Czech renting households



Source: own computation

Results for Finland

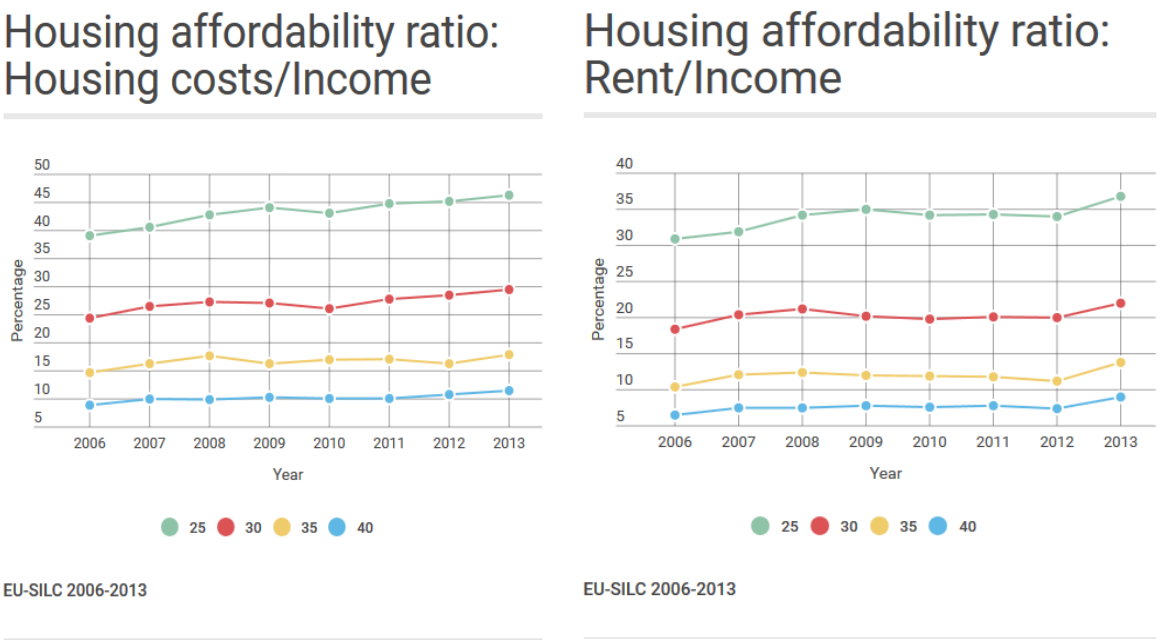
According to the results for "net" HCTI ratio we can see that housing affordability has decreased only slightly in Finland (see Figure 20). The HCTI 25 ratio has increased from 39. 1 % in 2006 to 46. 3 % in 2013. Compared to the Czech Republic where the HCTI 25 has increased by 20 % and where the overall percentage of renting households with this ratio accounted for 73 % of all renting households, we can conclude that Finnish renting households have a much better position here. The HCTI 40 shows that the percentage of these households has increased also slightly from 8. 9 % in 2006 to 11. 5 % in 2013. Not only in comparison with the Czech Republic, but also in comparison with the EU 28 average (where 25. 9 % of households had the HCTI ratio higher than 40 % in 2013), Finland is doing much better.

The RTI ratio computed only with the current rent as a main part of total housing costs and there was similar development of slight growth. For instance, 6. 5 % of Finnish renting households fell into the category with the RTI 40 ratio in 2006 and the percentage has increased only by 2. 5 % until 2013.

By comparing "net" and "gross" ratios it is possible to see the influence of housing allowance and I discovered that there is a significant difference between these two ratios.

For instance, 37. 2 % of Finnish renting households had “gross” HCTI ratio higher than 40 % in 2013. In the same year for the “net” HCTI ratio (taking into account a housing allowance) it was only 11. 5 % of households (lower by 25. 7 %). Which means that housing allowance had a significant impact on housing affordability in Finland. For the RTI ratio it is possible to observe similar results.

Figure 20 HCTI and RTI for the Finnish renting households



Source: own computation

One of the main disadvantages of housing expenditure-to-income ratios is misleading results affected by high-income households which spend more than 40 % on housing. This means that the ratio will take into account these households and the household can be regarded as unaffordable, but their remaining household budget could still be high enough to afford many non-housing goods and services. Therefore, I categorized households with “net” HCTI 40 ratio into decile groups to see how many “burdened” households belong to the highest decile groups. Table 25 shows that from all households with the HCTI 40 ratio only insignificant part belonged to the highest decile groups in both countries and I concluded that my results are not significantly influenced by these specific households.

Table 25 Distribution of renting households according to the "net" HCTI 40 ratio and decile groups (results from 2013)

Decile group	*HCTI 40 RATIO (%)*	
	Czech Republic	*Finland*
1	7.4	4.9
2	6.2	1.1
3	6.1	1.4
4	5.2	1.9
5	4.6	0.8
6	2.9	0.6
7	1.7	0.3
8	1.2	0.3
9	0.5	0.3
10	0.2	0.0
Total	**36.1**	**11.5**

Source: own computation

3.3.5 Housing affordability according to household type

In the following Table 26 9 different household types are recognized according to the EU-SILC description. The table shows the percentage of the different household types living in rental housing with “net” and “gross” HCTI 40 (housing costs over burden rate) in 2013. In the case of the Czech Republic as the most “burdened” household types can be defined as one person households (54. 16 % of all one person households had “net” HCTI ratio higher than 40 %) and single parent households with one or more dependent children (43. 38 % of all single parent households had “net” HCTI ratio higher than 40 %). When we take into account a difference between “gross” and “net” ratios, which shows influence of housing allowance on housing affordability, we can see that housing allowance decreased the percentage of one person households by only 5 %. On the other hand, housing allowance decreased the percentage of households made up of 2 adults and three or more dependent children significantly by 35 %.

But this household type does not belong to the most “burdened” household type, which means that housing allowance is not an efficient social benefit. In the case of Finland also the most “burdened” household types are defined as one person households (16 %) and single parent households with one or more dependent children (8. 51 %). Unlike the Czech Republic, housing allowance in Finland decreased the percentage of the most “burdened” households significantly. For one person households it declined by 34. 5 % and for single parent households 27. 89 %. It means that housing allowance in Finland is a more efficient social benefit to the improvement of housing affordability.

Table 26 Distribution of different household type according to "gross" and "net" HCTI 40 ratio (results from 2013)

HCTI 40 RATIO (%)	*Czech Republic*			*Finland*		
	"gross ratio"	*"net ratio"*	*Difference*	*"gross ratio"*	*"net ratio"*	*difference*
One person household	59.13	54.16	*4.97*	50.50	16.00	*34.50*
2 adults, no dependent children, both adults under 65 years	28.18	22.55	*5.63*	17.17	4.02	*13.15*
2 adults, no dependent children, at least one adult >=65 years	26.07	25.44	*0.63*	6.87	2.35	*4.52*
Other households without dependent children	27.13	27.13	*0.00*	19.71	1.29	*18.42*
Single parent household, one or more dependent children	61.46	43.38	*18.08*	36.40	8.51	*27.89*
2 adults, one dependent child	34.09	31.94	*2.15*	12.81	5.84	*6.97*
2 adults, two dependent children	21.41	21.41	*0.00*	13.79	7.14	*6.65*
2 adults, three or more dependent children	37.32	2.34	*34.98*	14.08	3.49	*10.59*
Other households with dependent children	25.86	25.86	*0.00*	15.92	11.62	*4.30*
Total	**41.27**	**36.09**	***5.18***	**37.23**	**11.52**	***25.71***

Source: Own computation

3.3.6 Housing affordability according to degree of urbanisation

Table 27 shows the percentage of renting households with “net” HCTI 40 according to the degree of urbanisation. From all “burdened” households (36. 1 %) more than half of these households (20. 4 %) are living in densely populated areas in the Czech Republic. Similar results can be observed in Finland. It is generally known that in densely populated areas, in other words big cities, housing costs are higher than in less populated areas. On the other hand, in big cities there are also relatively higher salaries. Conclusively, however, higher salaries cannot cover higher housing costs sufficiently.

Table 27 Distribution of renting households according to the "net" HCTI 40 ratio and degree of urbanisation (results from 2013)

HCTI 40 RATIO (%)	*Czech Republic*	*Finland*
densely populated area	20.4	6.8
intermediate area	10.7	2.5
thinly populated area	5.0	2.3
Total	**36.1**	**11.5**

Source: own computation

3.3.7 Housing affordability according to housing over-consumption

Housing expenditure-to-income ratios do not distinguish between households in need and those spending a large part of their incomes on housing because they wish to live at a high level of comfort. To identify "inadequate" spending I adopted the Thalmann's rule where *"an adequately sized flat is one in which the number of habitable rooms equals the number of inhabitants"*.[79] The percentage of households termed as "over-consuming" increased between 2006 and 2013 from 30 % to 44 % in the Czech Republic (see Table 28). In Finland the measurement has remained almost the same. Increasing over-consumption according to this measurement can partially explain worsening housing affordability in the Czech Republic. Although the percentage of "over-consuming" households has remained almost the same in Finland, the overall percentage is significantly higher (65. 1 %) than in the Czech Republic. Higher over-consumption can be explained by a far lower percentage of young people (between 20 and 29) living with their parents (only 17 % in 2014). Simultaneously, 55 % of young people were living independently in Finland.[80] The opposite results showed that in the Czech Republic almost 50 % of young people (between 25 and 29) were living with their parents.[81]

When we look at the distribution of different household types we can see that the biggest share accounts for one person households (24. 18 % in 2013). It is influenced by the fact that this household type cannot take advantage of economies of scale and they have to face housing costs alone.

[79] THALMANN, Philippe. *Identifying Households Which Need Housing Assistance*, 1999.
[80] OSF. *Dwellings and housing conditions*, 2014.
[81] EUROSTAT. *Being young in Europe today - family and society*, 2015.

Table 28 Distribution of renting household types according to the "net" HCTI 40 ratio and housing over-consumption

Household type/over-consumption (%)	*Czech Republic*		*Finland*	
	2006	*2013*	*2006*	*2013*
One person household	18.33	24.18	37.15	40.60
2 adults, no dependent children, both adults under 65 years	5.80	9.16	12.94	12.55
2 adults, no dependent children, at least one adult >=65 years	2.97	4.01	2.55	2.64
Other households without dependent children	0.53	0.96	0.76	0.55
Single parent household, one or more dependent children	1.55	2.14	4.80	4.32
2 adults, one dependent child	0.80	2.99	4.03	2.19
2 adults, two dependent children	0.10	0.48	1.65	1.71
2 adults, three or more dependent children	0.00	0.00	0.07	0.30
Other households with dependent children	0.04	0.08	0.16	0.22
Total	**30.12**	**44.00**	**64.11**	**65.10**

Source: own computation

3.4 Discussion

The aim of this chapter was the testing of housing affordability in the Czech and Finnish households.

The theory has shown us that for the owners that the most suitable indicator is house price-to-income ratio (HPTC ratio) and for tenants it is expenditure-to-income ratio. These methods take advantage of relatively simple design calculations and availability of necessary information, as well as drawbacks in the form of distorted results. It applies to high-income tenants which spend more than the pre-determined level on housing but their remaining income is still high enough to afford other non-housing goods. However, according to the ratio measurement they would be regarded as unaffordable.

In order to assess the housing affordability of Czech owner-occupied households I used the above-mentioned HPTC ratio which I adjusted as "net" and "gross" ratios (with/without housing allowance). I observed the indicator during the period from 2008 to 2013. The results show that more than 80 % of the owner-occupied households would need less than 10 disposable annual incomes to purchase their current housing. The most interesting findings were that the indicator was stable during the period, which indicates that housing affordability for the Czech ownership households has remained unchanged. The fact that between "gross" and "net" ratios there was almost no difference demonstrates that housing allowance does not influence the housing affordability of owners in the Czech Republic. Unfortunately, for the Finnish owner-occupied households it was not possible to compute

the same calculation, but another source (OECD) using a similar method of calculation showed that also among Finnish households housing affordability remains stable and unchanged.

In order to assess the housing affordability of the Czech and Finnish rental households two indicators were selected, inspired by the literature and based on housing expenditure-to-income ratios. Housing expenditures are represented by total housing costs (HCTI ratio) and rent (RTI ratio). Both indicators were adjusted as "gross" and "net" (with/without housing allowance) and ratios were observed during the period from 2006 to 2013.

The results showed that the situation for the Czech tenants has deteriorated significantly according to both of the indicators with a rapidly increasing share of households with a ratio higher than pre-determined levels. As for the housing allowance, this housing benefit also did not play an important role in the housing affordability for rental households as a whole. However, according to the classification of the different household types, housing allowance reduced the percentage of households consisting of two adults and three or more dependent children with the HCTI 40 ratio (cost over-burden rate) by 35% in 2013. The most “burdened” household types have been shown as one person households and single parent households with at least one dependent child, but there the housing allowances was not fully effective. According to the population density areas it has been shown that densely populated areas had a higher share of rental households who are “burdened” by housing costs. The concept of measuring housing over-consumption showed that the percentage of “burdened” households living in a flat with the number of habitable rooms higher than the number of inhabitants has increased by 14 % in the Czech Republic. Increasing housing over-consumption could also contribute to the worsening housing affordability situation for tenant households.

The housing affordability for the Finnish rental households was vastly different. The overall percentage of households with a high share of housing costs and rent in their disposable income was significantly lower when compared to the Czech Republic and the EU 28 average. Housing allowances played a greater role in the housing affordability there. Housing allowances have reduced the overall proportion of the "burdened" households by more than 25 % on average.

As in the case in the Czech Republic, in Finland the most "burdened" household type was also the one person households. The percentage of this household type has been significantly reduced with housing allowance (by 34. 5 % in 2013), likewise in the case of single parent households. Based on population density regions in Finland, a higher proportion of "burdened" households were in areas with the highest population density. Regarding the housing over-consumption, Finnish rental households reached an even higher percentage compared to the Czech Republic. It may be caused by a significantly higher proportion of young people living alone (independently) in Finland. The Czech Republic is facing exactly the opposite situation with a high proportion of young people living with their parents and it may explain their lower over-consumption ratio.
Based on the results and comments in this chapter I conclude that the research question of this thesis, which deals with the suspicion that Czech rental households are facing problems with housing affordability, has been proven.

CONCLUSION

In this Master's Thesis I have dealt with the measurements of housing affordability in the context of housing policy changes. The position of Czech households has been compared with Finnish households in the long term to see the development and impact of different housing policies on the issues of housing affordability. Some changes were possible to observe on the Czech housing market. The distribution of households by tenure status has been deflected towards home ownership and evidently, demand-side oriented housing policy and the deregulation process have contributed to this state. There was a suspicion that the deregulation process alone could have an unfavourable impact on housing affordability of rental households in the Czech Republic. It was low-income households who were forced to stay in rental housing with gradually increasing prices of renting due to the financially demanding nature of becoming a home-owner during the deregulation process. As the first chapter showed, social housing, which could have served as a compensation for increasing rents, accounts for only a negligible part of rental housing in the Czech Republic today. However, new legislation and a framework of social housing which could alleviate the position of burdened households, is still only in the preparation phase. Considering this, it is also questionable whether the municipalities, who will hold responsibility for provision of social housing, are prepared for it since they were involved in the privatisation of municipal housing in the first place, and their housing stock is insufficient.

The situation of the Czech housing market was compared with the situation in Finland. Social housing plays an important role in Finland. Besides social housing provided through renting housing, Finland presents another two tenure types with the aspect of advantaged housing: right-of-occupancy housing and part-ownership. Municipalities, as the largest owners of social housing, decide on the land use and they can manage social housing with the principle of subsidiarity and ensure the provision of social housing in the most effective way. Unlike the Czech Republic where the new concept of social housing does not solve the financing of social housing issues, Finland finances social housing effectively through ARAVA grants. Therefore, a whole social housing system can have a favourable impact on housing affordability in Finland which has been proven by the research illustrated in this thesis.

On the basis of the facts mentioned above, I came up with the research question dealing with presumption that Czech rental households are more burdened with housing costs than owner-occupied households due to changing conditions on the Czech housing market and also than the Finnish households in general due to a strong and efficient social housing system.

In order to prove that there are differences between the financial position of owner-occupied and rental households in context of housing affordability I tested through the econometrical probit model that the financial situation of the households have relation to tenure type. Eight explanatory variables were selected which can more or less explain a household's tenure choice. I assumed that variables revealing the potential financial burden are more likely for rental households, especially for Czech rental households. On the other hand, variables revealing stable financial positions, as for instance the ability to face unexpected financial expenses, are more likely for owners.

From the selected financial variables the greatest significance and impact on tenure choice had the following variables: disposable income, capacity to face unexpected financial expenses, ability to make ends meet and arrears on utility bills. Results showed that Czech rental households are more likely to be burdened with problems to make its ends meet and they are more likely to experience arrears on utility bills. The results for the variable of the ability to make ends meet have been increased more than once during the observed years. This means that the financial position of Czech rental households has deteriorated and it could indicate worsening housing affordability. On the other hand, results for Czech owner-occupied households showed that they are able to face unexpected financial expenses and the probability has been almost the same during the observed years. This means that the financial position of Czech owner-occupied households has been stable and it could also indicate a stable situation in case of housing affordability. However, it was disposable income that explained tenure choice with the highest estimates. Results for this variable showed that with rising income also increases the likelihood of choosing homeownership, because the purchase of one's own housing is a costly investment and therefore it is essential for a household to earn a sufficiently high income to afford that investment. The significance of this factor has been increasing in the long term.

When I compared the Czech and Finnish households I discovered that Finnish owner-occupied households are also more likely to be able to face unexpected financial expenses and a higher income indicates higher likelihood of choosing homeownership. Estimates are even higher than in case of the Czech Republic since there is a greater gap between the median disposable household incomes of owners and tenants in Finland. On the other hand, the results for tenants are not so clear. While the probability of problems with the ability to make ends meet is higher for tenants, but still lower than for Czech tenants, the probability of experiencing arrears on utility bills is higher for owners. Although the median household incomes are significantly higher for owners which can protect them against problems with the ability to make ends meet, tenants are strongly protected by social housing policy.

The hypothesis saying that there are differences between tenure types regarding their financial position has been proven. Therefore, I decided to measure housing affordability separately for owners and tenants.

In order to measure housing affordability, it was necessary to analyse suitable researching papers. Analysis of existing researching papers concerning housing affordability has shown the most suitable indicators for owners and tenants. In this Master's Thesis housing affordability for owner-occupied households was measured through house price-to-income ratio (HPTI ratio). The indicator observed the housing affordability development of owners during the period of 2006 to 2013. The measurement showed how many annual disposable incomes the household needed to purchase their current house. The development of this indicator revealed no changes during the observed time period for Czech owner-occupied households. This means that these households needed proportionally the same disposable incomes to afford their houses in spite of the fact that there were changing the distribution of households by tenure status (increasing percentage of owner-occupied households). Stable housing affordability of Finnish owner-occupied households was revealed by different research provided by OECD. ***Stable housing affordability for owner-occupied households is in accordance with the probit model results and statement in the research question.*** In order to see impact of housing allowances as one of the most important housing policy instruments, the ratio was adjusted as "gross" and "net" ratio depending on whether or not the housing allowances were used. There was almost no difference between "gross"

and “net” measurements which could have been influenced by a lower number of Czech households entitled to housing allowances compared to rental households. Average housing costs were also slightly lower for owners compared to tenants and only the level of housing costs is crucial for the benefit calculation.

On the basis of my research question I focused more attention on housing affordability of rental households where I assumed that just Czech rental households are more burdened with housing costs. Housing affordability of rental households was measured through two ratios: Housing costs-to-income ratio (HCTI ratio) and rent-to-income ratio (RTI ratio) in order to follow the housing affordability development of tenants during the period of 2006 to 2013. According to the ratios I identified the percentage of the population living in a household where the total housing costs (current rent related to occupied dwelling) represent more than pre-determined levels (25-40 %) of the total disposable household income. These households can be called “burdened households”. In the case of Czech rental households, both ratios showed a strong increasing percentage of burdened households across all pre-determined levels. ***It indicated worsening housing affordability of Czech rental households and it is in accordance with the probit model results and statement in the research question.*** In the case of Finnish rental households, results were significantly different. Firstly, the overall percentage of burdened households was much lower than for Czech rental households and secondly the development of ratios was stable during this time period. ***It indicates stable housing affordability in Finnish rental households and that their position is much better than Czech rental households, which is also in accordance with the statement in the research question.***

I also observed which household types were most burdened and I discovered that it was one person households and single parent households which are most burdened. The results were similar in both countries. In order to see the impact of housing allowances, the ratio was adjusted as “gross” and “net” ratios depending on whether or not the housing allowances were used. There I discovered that Finnish housing allowance helped decrease the percentage of burdened households significantly and this housing benefit helped the most burdened type of households. On the other hand, Czech housing allowance helped decrease the percentage of burdened households only slightly even in spite of the fact that the total volume of housing allowances has been increasing during the observed time period.

I can conclude that on the basis of all my results and measurements, the statement in the research question has been proven and Czech rental households have shown to be more burdened with housing costs and their housing affordability on the rental market has been deteriorating during the observed years.

REFERENCES

[1] ARA. *About ARA*. The Housing Finance and Development Centre of Finland (ARA) [online]. Finland, 2013 [cit. 2016-04-03]. Available at: <http://www.ara.fi/en-US/About_ARA>

[2] ARA. *Loans: Interest subsidy loans*. The Housing Finance and Development Centre of Finland (ARA) [online]. 2013 [cit. 2016-04-03]. Available at: <http://www.ara.fi/en-US/Housing_finance/Loans>

[3] CZECH NATIONAL BANK. *Harmonisation of monetary and financial statistics: data*. Czech National Bank [online]. 2015 [cit. 2015-08-11]. Available at: <https://www.cnb.cz/cs/statistika/menova_bankovni_stat/harm_stat_data/index.html#B>

[4] CZECH REPUBLIC. *Vyhláška č. 60/1964: Ústřední správy pro rozvoj místního hospodářství o úhradě za užívání bytu a za služby spojené s užíváním bytu / Government Regulation no. 60/1964 Coll. On Payments for Use of Flats and Services Related to the Use of Flat*. In: Sbírky zákonů Československé socialistické republiky / Czechoslovakian Legal Code. Prague: Knihtisk 1. národní podnik, 1964. Available at: <http://ftp.aspi.cz/opispdf/1964/027-1964.pdf>

[5] CZECH STATISTICAL OFFICE. *Bytová výstavba od roku 1993 / Housing construction from 1993*. In: Czech Statistical Office: Public Database [online]. 2015, 11.08.2015 [cit. 2015-08-11]. Available at: <http://vdb.czso.cz/vdbvo/tabparam.jsp?voa=tabulka&cislotab=STA1040CU&&kapitola_id=3>

[6] CZECH STATISTICAL OFFICE. *Population and Housing Census: 2011* [online]. 2015 [cit. 2015-08-11]. Available at: <https://www.czso.cz/csu/sldb/census_information>

[7] DEMOGRAPHIA. *Housing Affordability Rating Categories* [online]. USA [cit. 2016-03-27]. Available at: <http://www.demographia.com/dhi-ratings.pdf>

[8] DENG, Lan. *The Affordable Housing Reader*. Journal of Urban Affairs [online]. 2015, **37**(1), 82-84 [cit. 2016-01-11]. DOI: 10.1111/juaf.12079. ISSN 07352166. Available at: <https://www.researchgate.net/publication/235355600_Affordable_Housing_Reader>

[9] EDITORS DUNCAN MACLENNAN AND RUTH WILLIAMS. *Affordable housing in Britain and America*. York: Joseph Rowntree Foundation, 1990. ISBN 18-724-7009-2.

[10] EUROSTAT. *Average household size*: (EU-SILC). *Eurostat* [online]. Editor Ladislav Skala. 2015, 07.07.2015 [cit. 2015-08-11]. Available at: <http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ilc_lvph01&lang=en>

[11] EUROSTAT. *Being young in Europe today - family and society*. Eurostat [online]. European Commission, 2015 [cit. 2016-03-11]. Available at: <http://ec.europa.eu/eurostat/statistics-explained/index.php/Being_young_in_Europe_today_-_family_and_society>

[12] EUROSTAT. *Comparative price levels for food, beverages and tobacco*. Eurostat [online]. European Commission, 2013 [cit. 2016-02-07]. Available at: <http://ec.europa.eu/eurostat/statistics-explained/index.php/Comparative_price_levels_for_food,_beverages_and_tobacco>

[13] EUROSTAT. *Distribution of population by tenure status, type of household and income group:* (EU-SILC). *Eurostat* [online]. [cit. 2015-08-11]. Available at: <http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ilc_lvho02&lang=en>

[14] EUROSTAT. *EU statistics on income and living conditions (EU-SILC): Description of Dataset. Eurostat* [online]. European Commission [cit. 2016-01-18]. Available at: <http://ec.europa.eu/eurostat/web/microdata/european-union-statistics-on-income-and-living-conditions>

[15] EUROSTAT. *Glossary: Housing cost overburden rate*. *Eurostat* [online]. European Commision [cit. 2016-01-18]. Available at: <http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Housing_cost_overburden_rate>

[16] EUROSTAT. *Housing Conditions*. *Eurostat: EU statistics on income and living conditions (EU-SILC)* [online]. European Commission [cit. 2016-01-18]. Available at: <http://ec.europa.eu/eurostat/statistics-explained/index.php/Housing_conditions>

[17] EUROSTAT. *Housing cost overburden rate by income quintile*. *Eurostat: EU statistics on income and living conditions (EU-SILC)* [online]. European Commission, 2015 [cit. 2016-01-18]. Available at: <http://appsso.eurostat.ec.europa.eu/nui/show.do>

[18] FINLAND. *ACT ON STATE-SUBSIDIZED HOUSING LOANS (ARAVA LOANS)*. In: Ministry of the Environment, year 1993, No. 1189.

[19] GRIGSBY, William G a Louis Stanley ROSENBURG. *Urban housing policy*. New York: APS Publications, c1975. ISBN 08-798-8012-0.

[20] HAFFNER, Marietta. *EU-SILC: Should We Make Do with What We Have?* [online]. 2015, 2(2), 27-34 [cit. 2016-01-18]. DOI: 10.13060/23362839.2015.3.2.239. ISSN 2336-2839. Available at: <http://www.housing-critical.com/home-page-1/eu-silc-should-we-make-do-with-what-we-have>

[21] HUI, Eddie C. M. *Measuring Affordability in Public Housing from Economic Principles: Case Study of Hong Kong*. Journal of Urban Planning [online]. 2001, 127(1), 34-49 [cit. 2016-01-11]. ISSN 07339488. Available at: <https://www.researchgate.net/publication/245292171_Measuring_Affordability_in_Public_Housing_from_Economic_Principles_Case_Study_of_Hong_Kong>

[22] HULCHANSKI, David J. *The concept of housing affordability: Six contemporary uses of the housing expenditureto- income*. Housing Studies [online]. 1995, Oct95(Vol.10 4), 471 [cit. 2016-01-11]. ISSN 0267-3037. Available at: <http://www.urbancenter.utoronto.ca/pdfs/researchassociates/Hulchanski_Concept-H-Affd_H.pdf>

[23] INDUSTRIAL, CONSTRUCTION AND ENERGY STATISTICS DEPARTMENT. CZECH STATISTICAL OFFICE. *Bytová výstavba v územích České republiky v letech 1997–2011 / Housing construction in the Czech Republic between 1997-2011* [online]. Prague, 2013 [cit. 2015-08-11]. Available at: <https://www.czso.cz/documents/10180/20567463/820913t.pdf/a432e863-1381-490c-a70c-1e6a20bebd67?version=1.0>

[24] INFOPAKKI. *Part-ownership dwelling*. Infopakki: Living in Finland [online]. 2015 [cit. 2016-04-03]. Available at: <http://www.infopankki.fi/en/living-in-finland/housing/part-ownership-dwelling>

[25] INFOPAKKI. *Right-of-occupancy dwelling*. Infopankki: Living in Finland [online]. 2015 [cit. 2016-04-03]. Available at: <http://www.infopankki.fi/en/living-in-finland/housing/right-of-occupancy-dwelling>

[26] KELA. *Amount and taxation*. *Kela* [online]. The Social Insurance Institution of Finland, 2015 [cit. 2016-01-19]. Available at: <http://www.kela.fi/web/en/general-housing-allowance_amount-and-taxation>

[27] KELA. *General Housing Allowance. Kela* [online]. The Social Insurance Institution of Finland, 2015 [cit. 2016-01-19]. Available at: <http://www.kela.fi/web/en/general-housing-allowance>

[28] KELA. *Income*. Kela [online]. The Social Insurance Institution of Finland, 2015 [cit. 2016-01-19]. Available at: <http://www.kela.fi/web/en/229>

[29] KELA. *Statistics on general housing allowances.* Kela [online]. The Social Insurance Institution of Finland, 2014 [cit. 2016-01-19]. Available at: <http://www.kela.fi/web/en/statistics-by-topic_statistics-on-general-housing-allowances>

[30] KELA. *Types of housing and housing costs*. Kela [online]. The Social Insurance Institution of Finland, 2014 [cit. 2016-01-19]. Available at: <http://www.kela.fi/web/en/types-of-housing-and-housing-costs>

[31] LUX, Martin. *Housing policy and housing finance in the Czech Republic during transition: an example of the schism between the still-living past and the need of reform*. Delft: Delft University of Technology, c2009. Sustainable Urban Areas. ISBN 978-160-7500-582.

[32] LUX, Martin. *O spokojenosti českých občanů s užívaným bydlením / On housing satisfaction among Czech citizens*. Sociologický časopis / Czech Sociological Review [online]. 2005, (Vol. 41, No. 2), 227-252 [cit. 2016-02-19]. Available at: <http://sreview.soc.cas.cz/uploads/174991c37f05f03d5fe387883d7a4a8d6f527abf_548_24lux20.pdf>

[33] LUX, Martin. *The effectiveness of selected housing subsidies in the Czech Republic*. Journal of Housing [online]. 2009, 24(3), 249-269 [cit. 2016-03-24]. DOI: 10.1007/s10901-009-9153-1. ISSN 15664910.

[34] LUX, MARTIN. *Vliv podmínek bydlení na zamýšlenou migraci české populace za prací / The Effect of Housing Conditions on the Intended Labour Migration of the Czech Population*. Sociologický Časopis / Czech Sociological Review [online]. 2007, 43(2), 305 [cit. 2016-02-19]. ISSN 00380288. Available at: <http://sreview.soc.cas.cz/uploads/a51a09eb8021894f69d7073d19910c966c3331e6_642_07-2%20LuxSunega.pdf>

[35] MINISTRY OF LABOUR AND SOCIAL AFFAIRS. *Příspěvek na bydlení / Housing Allowance*. Integrated portal of MLSA [online]. Prague: MLSA, 2016 [cit. 2016-01-19]. Available at: <https://portal.mpsv.cz/soc/ssp/obcane/prisp_na_bydleni>

[36] MINISTRY OF LABOUR AND SOCIAL AFFAIRS. *Social Housing Concept of Czech Republic 2015 – 2025* [online]. MLSA, 2015 [cit. 2016-04-03]. Available at: <http://www.mpsv.cz/files/clanky/22514/Koncepce_soc_bydleni_2015.pdf>

[37] MINISTRY OF LABOUR AND SOCIAL AFFAIRS. *State Social Support* [online]. MLSA Prague [cit. 2016-04-13]. Available at: <http://www.mpsv.cz/en/1603>

[38] MINISTRY OF REGIONAL DEVELOPMENT. *Housing policy concept of the Czech Republic till 2020*. In: *Usnesení vlády č. 524*. Czech Republic, 2011. Available at: <http://www.mmr.cz/getmedia/66bfa9e5-dcca-402e-a8ae-1d3fbfe415ef/Koncepce-bydleni-CR-do-roku-2020.pdf?ext=.pdf>

[39] MINISTRY OF REGIONAL DEVELOPMENT. *Housing Policy*. In: *Ministry of Regional Development* [online]. [cit. 2015-08-11]. Available at: <http://www.mmr.cz/en/Stavebni-rad-a-bytova-politika/Bytova-politika>

[40] MINISTRY OF REGIONAL DEVELOPMENT. *Přehled podpor v oblasti bydlení* / Review of housing support [online]. Czech Republic, 2011 [cit. 2015-07-31]. Available at: <http://www.mmr.cz/getmedia/9910944e-75ec-4eb1-9008-f9cd45a0fb9f/Priloha_prehled-podpor.pdf?ext=.pdf>

[41] MINISTRY OF REGIONAL DEVELOPMENT. *Selected Data on Housing: 2014* [online]. Prague, 2015 [cit. 2015-08-11]. ISBN 978-80-7538-005-0. Available at: <http://www.mmr.cz/getmedia/537f9774-b5f2-4c85-90f8-cca28c512d8f/Zprava-2014.pdf?ext=.pdf>

[42] MINISTRY OF REGIONAL DEVELOPMENT. *Zpráva o plnění úkolů uložených v Koncepci bydlení České republiky do roku 2020 za rok 2014 / Report from the control of the performance of the state housing policy concept till 2020 for 2014* [online]. Czech Republic, 2015 [cit. 2015-07-31]. Available at: <http://www.mmr.cz/getmedia/537f9774-b5f2-4c85-90f8-cca28c512d8f/Zprava-2014.pdf?ext=.pdf>

[43] MINISTRY OF THE ENVIRONMENT. *Housing* [online]. Finnish Government, 2013 [cit. 2016-04-03]. Available at: <http://www.ym.fi/en-US/Housing>

[44] MUNIFIN. *Municipality Finance* [online]. Finland [cit. 2016-04-03]. Available at: <https://www.munifin.fi/>

[45] OECD. *Focus on house prices*. OECD [online]. [cit. 2016-02-20]. Available at: <http://www.oecd.org/eco/outlook/focusonhouseprices.htm>

[46] OFFICIAL STATISTICS OF FINALND (OSF). *Prices of dwellings in housing companies* [e-publication]: ISSN=2323-8801 [online]. Finland: Helsinki: Statistics Finland [cit. 2016-02-19]. Available at: <http://www.stat.fi/til/ashi/tau_en.html>

[47] PERRY, David Garnett and John. *Housing finance*. [New ed.]. Coventry: Chartered Institute of Housing, 2005. ISBN 978-190-3208-533.

[48] PITTINI, Alice, Laurent GHEKIERE, Julien DIJOL a Igor KISS. *The state of housing in the EU 2015* [online]. Brussel, 2015 [cit. 2016-01-18]. Available at: <http://is.muni.cz/repo/1301071/Publication_for_WEB.pdf>

[49] PITTINI, Alice. *Housing Affordability in the EU: Current situation and recent trends* [online]. European Social Housing Observatory, 2012, 5(1), 12 [cit. 2016-01-18]. Available at: <http://www.iut.nu/Literature/2012/CECODHAS_HousingAffordability2012.pdf>

[50] POLÁKOVÁ, Olga. *Bydlení a bytová politika / Housing and Housing policy*. Vyd. 1. Prague: Ekopress, 2006. ISBN 80-869-2903-5.

[51] ROBINSON, Mark, Grant M. SCOBIE a Brian HALLINAN. *Affordability of Housing: Concepts, Measurement and Evidence*, Working paper. The Treasury [online]. New Zealand, 2006 [cit. 2016-01-11]. Available at: <http://www.treasury.govt.nz/publications/research-policy/wp/2006/06-03>

[52] TÄHTINEN, Timo. *Financing Social Housing in Finland*. Housing Finance International [online]. 22-26 [cit. 2016-04-03]. Available at: <http://www.housingfinance.org/uploads/Publicationsmanager/0306_Fin.pdf>

[53] THALMANN, Philippe. *Identifying Households Which Need Housing Assistance*. Urban Studies (Routledge) [online]. 1999, 36(11), 1933-1947 [cit. 2016-03-11]. ISSN 00420980. Available at: <http://eds.a.ebscohost.com/eds/pdfviewer/pdfviewer?vid=2&sid=1257c9ed-29c7-44c6-b474-cd8083667ee8%40sessionmgr4001&hid=4108>

[54] TSHARAKYAN, Ashot a Petr ZEMČÍK. *Rent deregulation, tenure choice, and real estate price expectations* [online]. Prague: CERGE-EI, 2011 [cit. 2015-08-11]. Working paper series (CERGE-EI). ISBN 978-80-7343-231-7. Available at: <http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1784203>

[55] TULLA, Sirpa. *Securitisation and Finance for Social Housing in Finland*. Urban Studies (Routledge) [online]. 1999, 36(4), 647-656 [cit. 2016-04-03]. ISSN 00420980. Available at: <http://usj.sagepub.com/content/36/4/647.abstract>

[56] WOOLDRIDGE, Jeffrey M. *Introductory econometrics: a modern approach*. *Introductory econometrics: a modern approach / Jeffrey M. Wooldridge*. 2016. ISBN 9781305270107.

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

ARA	Housing Finance and Development Centre of Finland
CNB	Czech National Bank
Coll.	Civil Code
CSO	Czech Statistical Office
CZK	Czech crown
EU	European Union
EUR	Euro
EU-SILC	EU statistics on income and living conditions
HCTI	Housing costs-to-income ratio
HPTI	House price-to-income ratio
KELA	Finnish independent social security institution
ME	Ministry of the Environment
MF	Ministry of Finance
MI	Ministry of the Interior
MLSA	Ministry of Labour and Social Affairs
MRD	Ministry of Regional Development
OECD	Organisation for Economic Co-operation and Development
OSF	Official Statistics of Finland
RTI	Rent-to-income ratio
SHDF	State Housing Development Fund

APPENDICES

Appendix A: The European Union Statistics on Income and Living Conditions

EU-SILC represents policy monitoring for comparative statistics on income distribution, social inclusion and living conditions in EU Member States launched in 2003. The role of this statistic is to cover objective and subjective aspects of particular themes in both monetary and on-monetary terms for households and individuals. The statistic is collected as comparable multidimensional micro-data on: Income, poverty, social exclusion, housing, labour, education and health.

EU-SILC is compulsory for all EU Member States and is organized as the common framework defined by harmonised lists of primary (annual) and secondary (every four years) variables. Design of the statistic is implemented on the basis of common requirements and classification with aim to maximize comparability of information represented situation in particular member state.

Annual data provided by EU-SILC are divided into 2 groups:

a) Cross-sectional data (providing information pertaining to a given time period with variables on different dimensional micro-data)

b) Longitudinal data (providing information pertaining to individual-level changes over time, when household or individual is observed periodically over a four year period)[82]

Housing conditions

In this subject area EU-SILC observes the following indicators: distribution of population along different, dimensions, average number of rooms per person, overcrowding rate, share of people living in under-occupied dwelling along with different dimensions, housing costs overburden rate and median of the housing cost burden distribution along with different dimensions.

Monitoring these indicators, the EU struggles to obtain necessary information to reverse worsening affordability, homelessness, social and housing polarisation and new forms of housing deprivation.[83]

[82] EUROSTAT. *EU statistics on income and living conditions (EU-SILC): Description of Dataset*
[83] EUROSTAT. *Housing Conditions. Eurostat: EU statistics on income and living conditions*

From a subjective point of view, EU-SILC monitored the European citizens' perception of their financial burden due to housing costs through the question whether "*Is total housing cost a financial burden to your household?*" Respondents were asked to choose between these options: heavy burden, somewhat a burden, not a burden at all.

Housing affordability is in EU-SILC database captured via Housing cost overburden rate. This indicator represents "*the percentage of the population living in households where the total housing costs ('net' of housing allowances) represent more than 40 % of disposable income ('net' of housing allowances)*". [84]

In spite of numerous useful pieces of information provided by EU-SILC, there are also methodological and conceptual issues that should be taken into account in interpreting results. As a first the methodological issue can be mentioned related to reference period mismatch. While cost components are collected for the "current" (from the time of an interview) period, income is usually from the year "before". And costs that may have risen as a response to rent control or increasing interest rates, should then be linked to income level. It would be also useful in housing studies to be able to distinguish direct costs to rent or mortgage costs from housing energy costs, but not all components of cost or overburden can be separated in this database. This indicator is a relative measure of housing costs to disposable income and does not interpret whether people have sufficient disposable income to afford a basket of goods and services that is considered by society as a minimally essential. This conceptual issue could be resolved with a residual income approach. There is also no option to distinguish social renting from commercial renting because the rental sector is in this statistic defined by tenants that are "paying rent at prevailing or market rate" and tenants that are "paying rent lower than market rent". According to the instructions, if distinction between these two categories is not clear, the dwelling should be classified as first category with market rent and therefore overall results can be misleading.[85]

[84] EUROSTAT. *Glossary: Housing cost overburden rate*
[85] HAFFNER, Marietta. *EU-SILC: Should We Make Do with What We Have?*, 2015.

Appendix B: Description of EU-SILC variables

Ability to make ends meet	The variable refers to the respondent feeling about the level of difficulty experienced by the household in making ends meet based on the household's total net income. As making ends meet is to be defined as paying usual necessary expenses. The respondent feeling is measured through the scale comprising 6 degrees: with great difficulty, with difficulty, with some difficulty, fairly easily, easily, and very easily.
Financial burden of the total housing cost	The variable refers to the respondent feeling about the extent to which housing costs are a financial burden to the household. As housing costs are defined total mortgage repayment including instalment and interest for owners and actual rent for renters. There are also considered costs as regular maintenance, repairs and other charges. The variable should cover only what the household actually pays and not the accumulation of arrears over past periods.
Arrears on utility bills	The variable ascertains whether the household has been in arrears in the last 12 months for the main dwelling, when they were unable to pay on time utility bills as heating, electricity, gas, water, etc. Telephone bills are not considered as utility bills in this item. Payments managed through borrowing (from bank, relatives or friends) is considered in the same way as if the household manages to pay through own resources.
Total housing costs	Total housing costs refers to monthly costs connected with the households' right to live in the accommodation together with the costs of utilities (water, electricity, gas and heating). Components for owners have to include in housing costs: mortgage interest payments (net of any tax relief), gross of housing benefits, structural insurance, mandatory services and charges, regular maintenance and repairs, taxes and the costs of utilities. For tenants it means including rent payments, also gross of housing benefits and other costs resembling the owner's housing costs as services, maintenance, repairs etc.
Total disposable household income	The variable defines year-long disposable income constructed as the sum for all household members of gross income components including: gross employee cash or near cash income, gross non-cash employee income, company car, employer's social insurance contributions, gross cash benefits or losses from self-employment, value of goods produced for own consumption, pensions received from individual private plans, unemployment benefits, old-age benefits, survivor' benefits, sickness benefits, disability benefits and education-related allowances. The sum is increased by gross income components at household level including: imputed rent, income from rental of a property or land, family/children related allowances, social exclusion, housing allowances, regular inter-household cash transfers received, interest, dividends, profit from capital investments in unincorporated business and income received by people aged under 16. The overall sum of these components is reduced by employer's social insurance contributions, interest paid on mortgage, regular taxes on wealth, regular inter-household cash transfer paid, tax on income and social insurance contributions. For the purpose of computation, total disposable household income was adjusted as monthly income and transformed with natural algorithm.
Capacity to afford a meal with meat, chicken, fish (or vegetarian equivalent) every second day	The variable inquires whether the household can afford a meal with meat, chicken or fish (or equivalent vegetarian) every second day. We do not take into account if the household in reality wants it. Respondent answers "yes" (denoted by 1) or "no" (denoted by 0).
Capacity to afford paying for one week annual holiday away from home	The variable inquires whether the whole household can afford to go for a week's annual holiday away from home, regardless if the household wants it. As holiday is also considered holiday by using its "social network", subsidized holidays or its second dwelling. "Whole household" does not mean that the household members have to go at the same time all together for holidays. Respondent answers "yes" (denoted by 1) or "no" (denoted by 0).

Capacity to face unexpected financial expenses	The variable ascertains whether the household can face itself unexpected financial expenses with their own resources. As “own resources” are considered situations when: household does not ask for financial help from anybody, household’s account is debited with the required period and household’s situation regarding potential debts is not deteriorated. Respondent answers “yes” (denoted by 1) or “no” (denoted by 0).
Tenure status	Tenure status takes two basic values: Tenants (denoted by 0) and Owner-occupiers (denoted by 1). According to EU-SILC description of target variables, as owner-occupiers are defined outright owners and owners paying mortgage. The owner is considered as “outright owner” when there is no mortgage paid for buying the main dwelling. The owner is considered as “owner paying mortgage” when there is mortgage paid for buying the main dwelling. The owner who pays mortgage only for the second dwelling and/or for repairs, renovation, maintenance etc. is considered as “outright owner”. Household living in cooperative apartment is also considered as owner-occupier. As tenants are defined tenants paying rent at prevailing or market rate, regardless of whether the rent is wholly recovered from housing benefits or other sources. Then we also count with tenants paying rent at a reduced rate. Reduced rate renters include those renting social housing, renting from an employer and in accommodation where the actual rent is fixed by law.
House price	The question estimates current house prices in the country. Respondent communicates what is the price of a flat / house in which he/she lives. The price should correspond to the area in which the property is located, its size and status.
Housing allowances	Housing allowances represent benefits with aim to help households meet the cost of housing. As an essential criterion is the existence of definition of the scope of a housing allowance set by public authorities. It includes rent benefit directed to tenants (temporarily or on a long-term basis) to help them with rent costs and benefit to owner-occupiers to alleviate their current housing costs (the most often to help with paying mortgages and interest). This variable excludes social housing policy organised through the fiscal system as tax benefits and all capital transfers as investment grants.
Current rent related to occupied dwelling	The variable represents the total monthly current rent paid on the main residence of household for the use of an unfurnished dwelling. Rentals include payments for the use of a garage for parking in connection with the dwelling. Other payments as electricity, heating, regular repairs and maintenance etc., should be excluded. In case when part of the rent is paid through a housing benefit, the total rent payable is taken into account.

Appendix C: Results for the Chi-squared test and Cramer's V

Chi-Square Tests			
Czech Republic/owners	*Value*	*df*	*Asymp. Sig. (2-sided)*
Pearson Chi-Square	734005.735[a]	16	0.000
Likelihood Ratio	750348	16	0.000
Linear-by-Linear Association	658153	1	0.000
N of Valid Cases	3335219		

Symmetric Measures			
Czech Republic/owners		*Value*	*Approx. Sig.*
Nominal by Nominal	*Phi*	0.469	0.000
	Cramer's V	0.235	0.000
N of Valid Cases		3335219	

Chi-Square Tests			
Finland/owners	*Value*	*df*	*Asymp. Sig. (2-sided)*
Pearson Chi-Square	470730.687[a]	16	0.000
Likelihood Ratio	481647	16	0.000
Linear-by-Linear Association	419963	1	0.000
N of Valid Cases	1744840		

Symmetric Measures			
Finland/owners		*Value*	*Approx. Sig.*
Nominal by Nominal	*Phi*	0.519	0.000
	Cramer's V	0.260	0.000
N of Valid Cases		1744840	

Chi-Square Tests			
Czech Republic/tenants	*Value*	*df*	*Asymp. Sig. (2-sided)*
Pearson Chi-Square	183595.147[a]	16	0.000
Likelihood Ratio	176903	16	0.000
Linear-by-Linear Association	143508	1	0.000
N of Valid Cases	752578		

Symmetric Measures			
Czech Republic/tenants		Value	Approx. Sig.
Nominal by Nominal	Phi	0.494	0.000
	Cramer's V	0.247	0.000
N of Valid Cases		752578	

Chi-Square Tests			
Finland/tenants	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	392502.048[a]	16	0.000
Likelihood Ratio	381949	16	0.000
Linear-by-Linear Association	295993	1	0.000
N of Valid Cases	828050		

Symmetric Measures			
Finland/tenants		Value	Approx. Sig.
Nominal by Nominal	Phi	0.688	0.000
	Cramer's V	0.344	0.000
N of Valid Cases		828050	